TEST REPORT

Applicant Name :	Shenzhen VanTop Technology & Innovation Co., Ltd.
Address :	506, 5th Flr. BLDG 4, MinQi Technology Park, No. 65 Lishan Road, Taoyuan Street, Nanshan District, Shenzhen, China
Report Number :	SZNS220606-24734E-RF-00B
FCC ID:	2AQ3A-VT01

Test Standard (s)

FCC PART 15.407

Sample Description

Product Type:	Projector
Model No.:	Leisure 470Pro
Multiple Model(s) No.:	Leisure 470,Leisure D30T,Leisure 530W,Leisure E30T, Leisure630W,Leisure495W ,VT501,VT502,VT503,VT504,VT505, VT506,VT507,VT508,VT509,VT510,VT511,VT512,VT513,VT514, VT515,VT516,VT517,VT518,VT519,VT520 (Please refer to DOS for Model difference)
Trade Mark:	N/A
Date Received:	2022/05/18
Report Date:	2022/08/19

Test Result:	Pass*

* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Andy Yu
EMC Engineer

Approved By:

Candy Li
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★".

Shenzhen Accurate Technology Co., Ltd. is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk '*'. Customer model name, addresses, names, trademarks etc. are not considered data.

This report cannot be reproduced except in full, without prior written approval of the Company. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Frequency Range	5G Wi-Fi: 5150-5250MHz; 5725-5850MHz
Mode	802.11a/n20/n40
Maximum Conducted Average Output Power	5150-5250 MHz: 11.08dBm 5725-5850 MHz: 12.13dBm
Modulation Technique	OFDM
Antenna Specification*	3.27dBi (It is provided by the applicant)
Voltage Range	AC 120V/60Hz
Sample serial number	SZNS220606-24734E-RF-S1 for Conducted and Radiated Emissions SZNS220606-24734E-RF-S2 for RF Conducted Test (Assigned by ATC)
Sample/EUT Status	Good condition

Objective

This test report is in accordance with Part 2-Subpart J, Part 15-Subparts A and E of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart E, section 15.203, 15.205, 15.207, 15.209 and 15.407 rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices. And KDB789033 D02 General U-NII Test Procedures New Rules v02r01.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF Frequency		$0.082*10^{-7}$
RF output power, conducted		0.73dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	9kHz - 30MHz	2.66dB
	30MHz - 1GHz	4.28dB
	1GHz - 18GHz	4.98dB
	18GHz - 26.5GHz	5.06dB
	26.5GHz - 40GHz	4.72dB
Temperature		1℃
Humidity		6%
Supply voltages		0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 429 7.01.

Listed by Innovation, Science and Economic Development Canada (ISEDC), the Registration Number is 5077A.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode, which was provided by manufacturer.

The device support 5G Wi-Fi 802.11a/n20/n40 modes.

For 5150-5250MHz Band, 6 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
38	5190	46	5230
40	5200	48	5240

For 802.11a/n20 mode: channel 36, 40, 48 were tested;
For 802.11n40 mode: channel 38, 46 were tested;

For 5725-5850MHz Band, 7 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	157	5785
151	5755	159	5795
153	5765	161	5805
/	/	165	5825

For 802.11a/n20 mode: channel 149, 157, 165 were tested;
For 802.11n40 mode: channel 151, 159 were tested;

EUT Exercise Software

'SecureCRT"* exercise software was used. The software and power level was provided by the applicant.

The worst case was performed under:

U-NII	Mode	Date rate	Power Level*		
			Low Channel	Middle Channel	High Channel
5150 – 5250MHz	802.11a	6Mbps	48	48	48
	802.11n-HT20	MCS0	48	48	48
	802.11n-HT40	MCS0	48	/	48
5725 – 5850MHz	802.11a	6Mbps	48	48	48
	802.11n-HT20	MCS0	48	48	48
	802.11n-HT40	MCS0	48	/	48

The worse-case data rates are determined to be as follows for each mode based upon investigations by measuring the output power and PSD across all data rated bandwidths, and modulations.

The software and power level was provided by the applicant.

Equipment Modifications

No modification was made to the EUT tested.

Duty cycle

5150 MHz – 5250 MHz:

Mode	Ton (ms)	Ton+off (ms)	Duty Cycle(%)	Duty Cycle Factor(dB)
802.11a	1.391	1.460	95.27	0.21
802.11n20	5.083	5.153	98.64	0.06
802.11n40	2.469	2.538	97.28	0.12

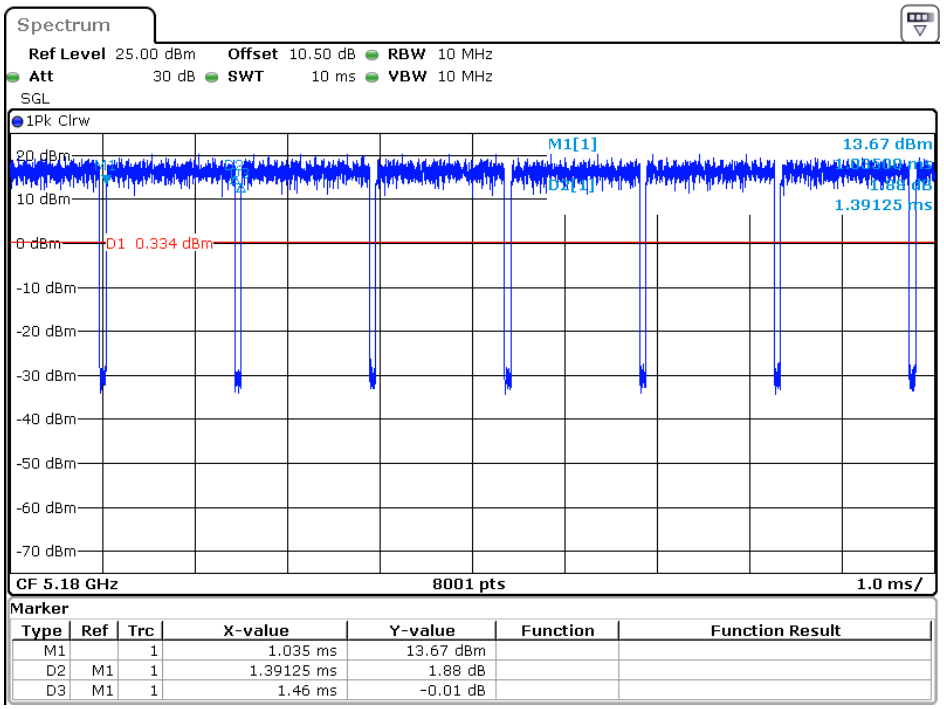
5725 MHz – 5850 MHz:

Mode	Ton (ms)	Ton+off (ms)	Duty Cycle(%)	Duty Cycle Factor(dB)
802.11a	1.393	1.461	95.35	0.21
802.11n20	5.085	5.154	98.66	0.06
802.11n40	2.468	2.536	97.32	0.12

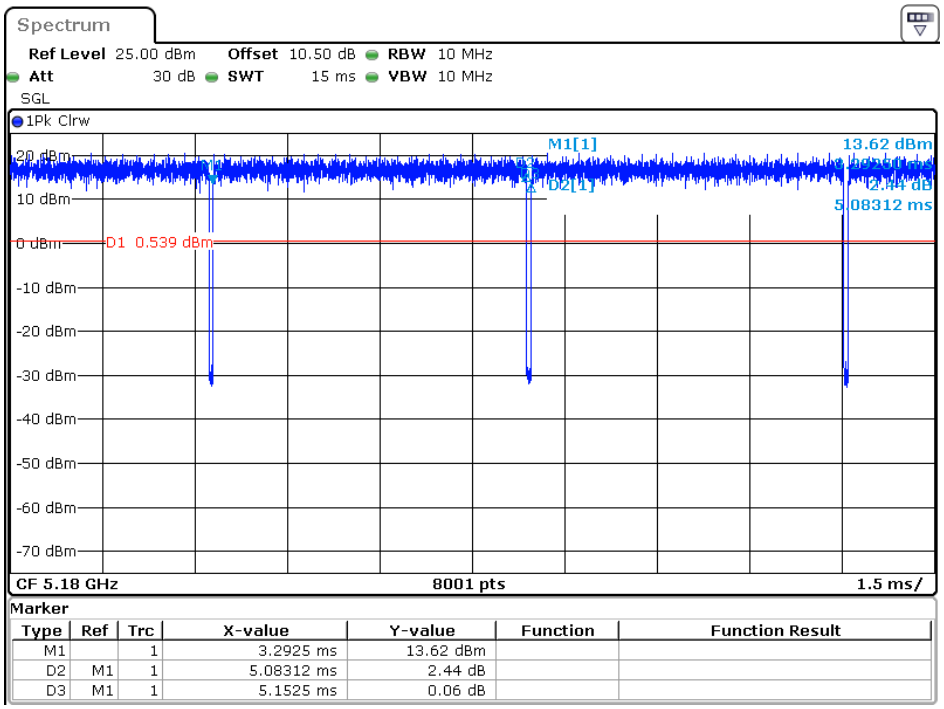
Note: Duty cycle factor=10*log(1/Duty cycle)

5150-5250 MHz:

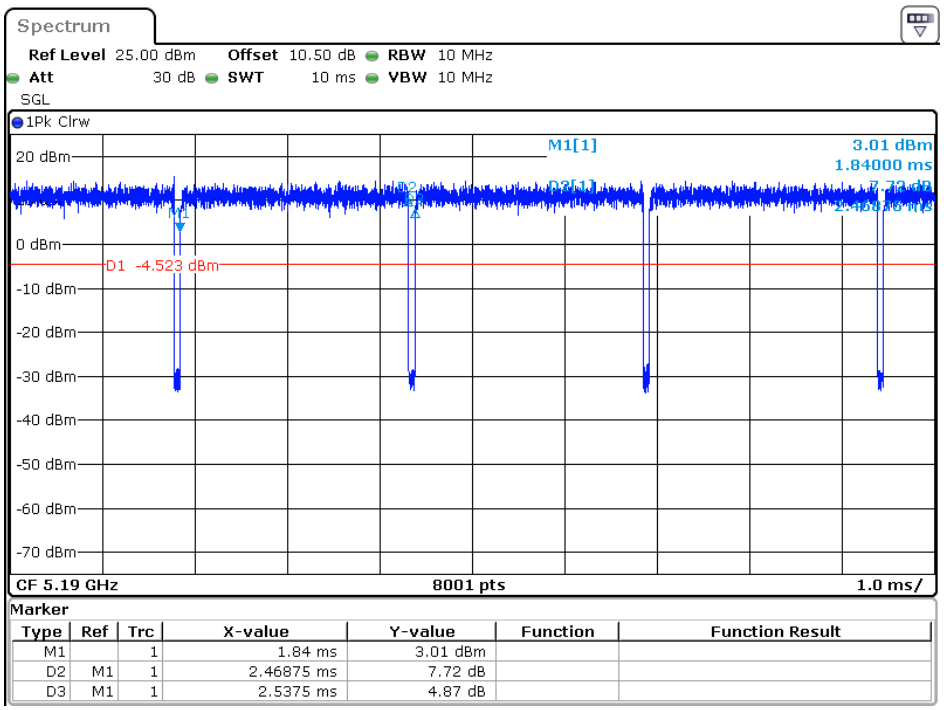
802.11a mode



802.11n20 mode

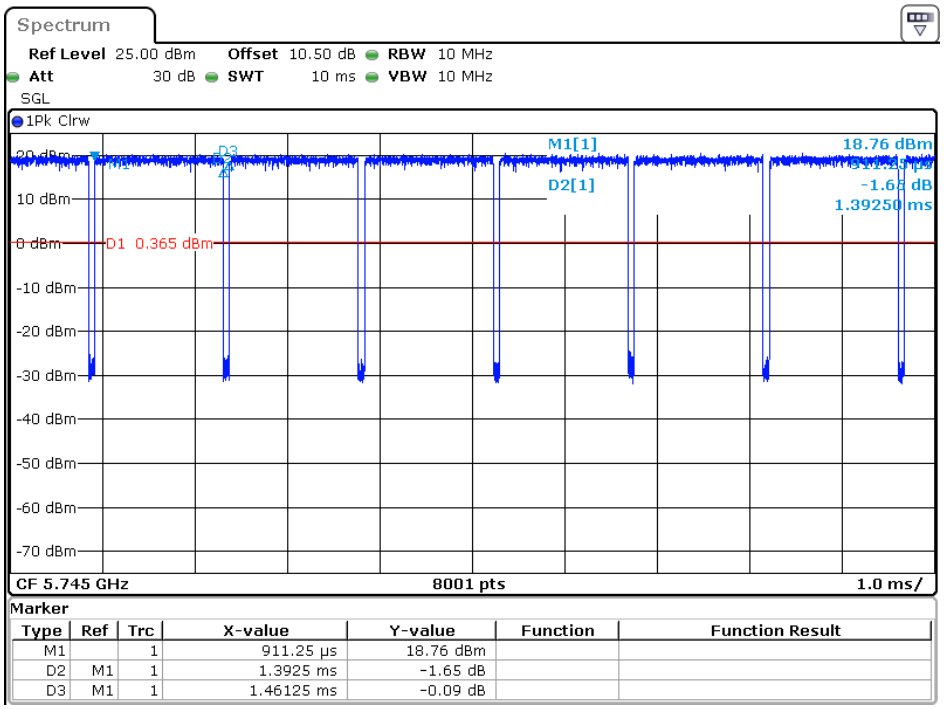


802.11n40 mode

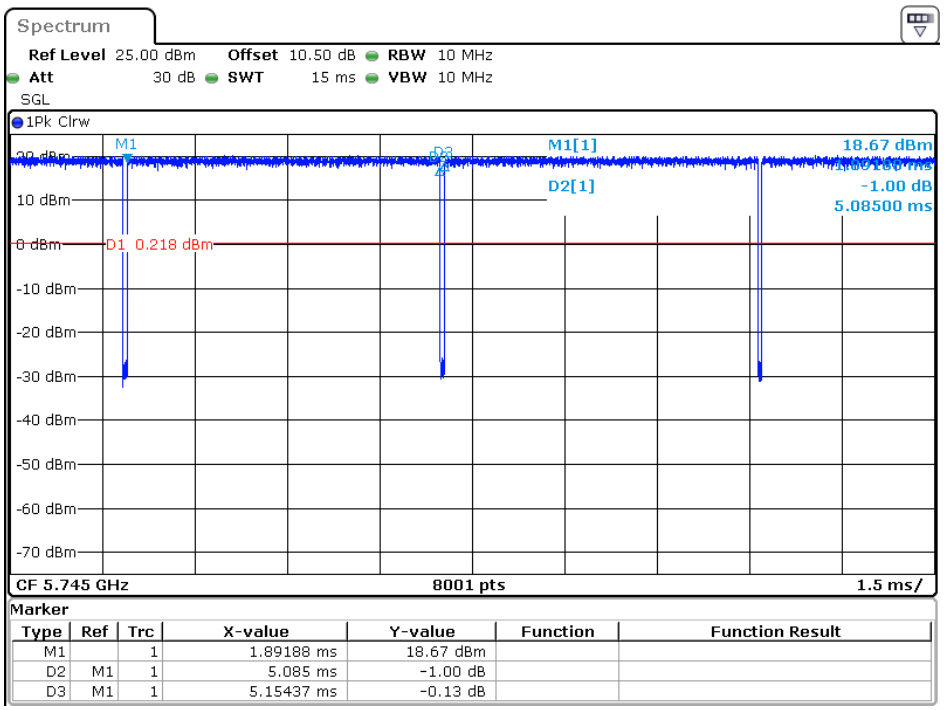


5725-5850MHz:

802.11a mode



802.11n20 mode

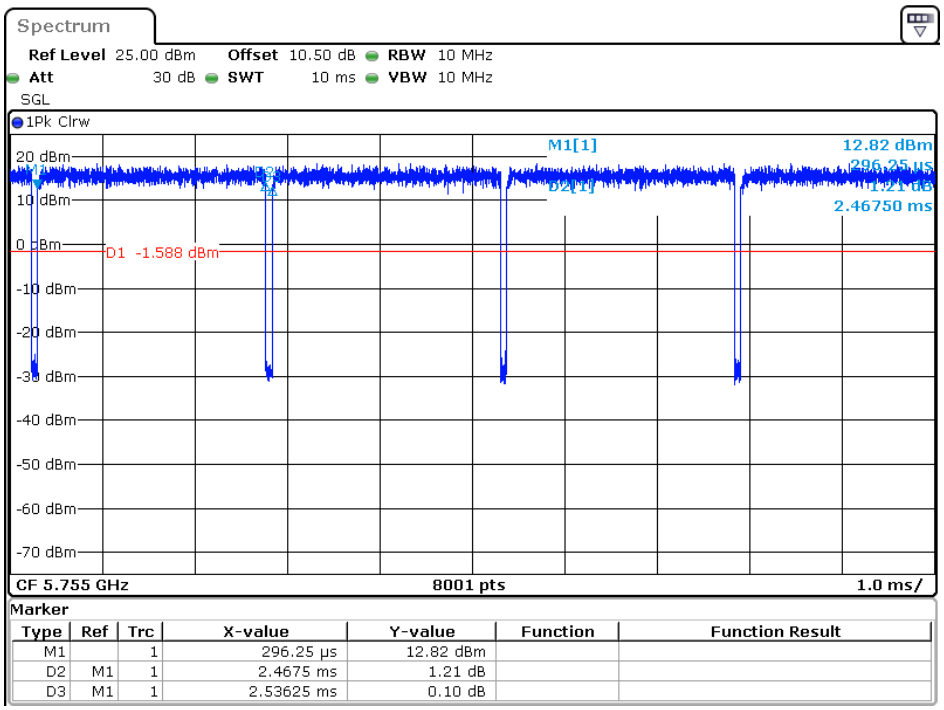


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	1.89188 ms	18.67 dBm		
D2	M1	1	5.085 ms	-1.00 dB		
D3	M1	1	5.15437 ms	-0.13 dB		

Date: 13.AUG.2022 13:10:24

802.11n40 mode



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	296.25 µs	12.82 dBm		
D2	M1	1	2.4675 ms	1.21 dB		
D3	M1	1	2.53625 ms	0.10 dB		

Date: 13.AUG.2022 13:37:02

Support Equipment List and Details

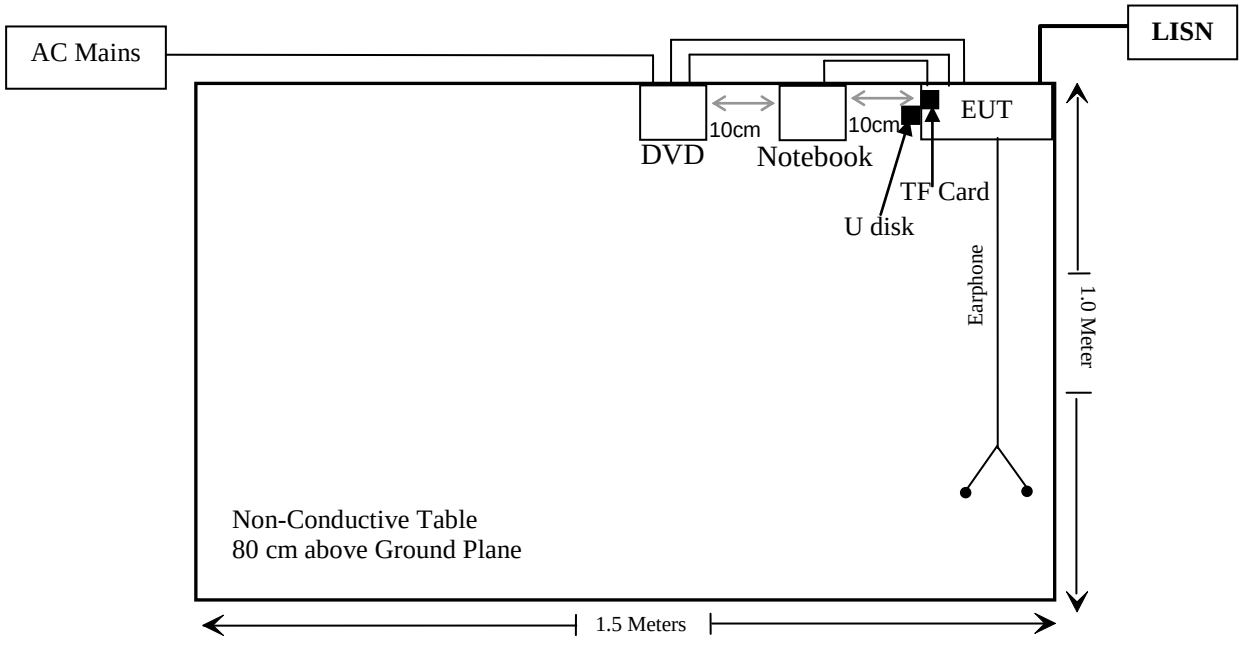
Manufacturer	Description	Model	Serial Number
DELL	Note Book	XXJL-2	F87B1B8
Unknown	Earphone	Unknown	Earphone 1
Unknown	U disk	Unknown	U-1
SAST	DVD	SA-016	25113
Unknown	TF Card	Unknown	TF-1

External I/O Cable

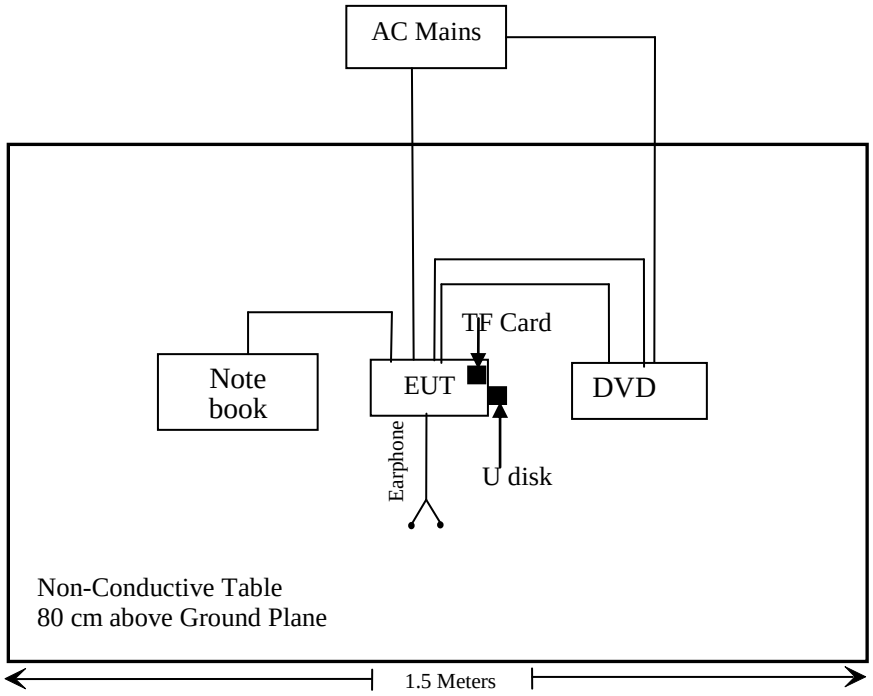
Cable Description	Length (m)	From/Port	To
Unshielded detachable AC cable	1.0	EUT	LISN
Un-shielded detachable HDMI cable	1.5	Note Book	EUT
Un-shielded detachable HDMI cable	1.5	DVD	EUT
Unshielded detachable AV cable	1.0	DVD	EUT

Block Diagram of Test Setup

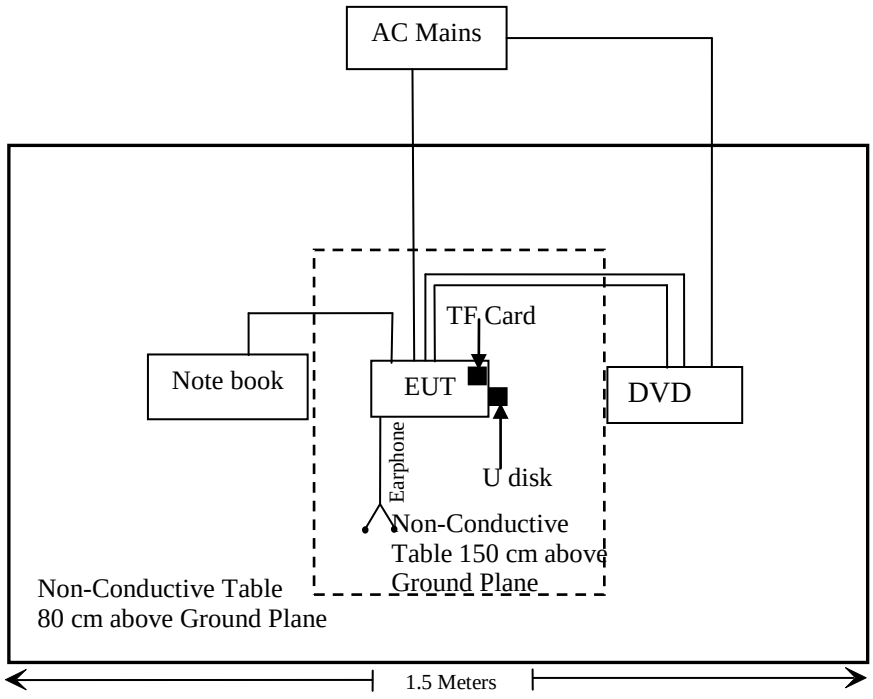
For conducted emission:



For radiated emission: (below 1GHz)



For radiated emission: (above 1GHz)



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.407 (f), §1.1310 & §2.1091	MAXIMUM PERMISSIBLE EXPOSURE (MPE)	Compliant
§15.203	Antenna Requirement	Compliant
§15.407(b)(9)& §15.207(a)	Conducted Emissions	Compliant
§15.205& §15.209 & §15.407(b)	Undesirable Emission& Restricted Bands	Compliant
§15.407(a) (e)	26 dB Emission Bandwidth & 6dB Bandwidth	Compliant
§15.407(a)	Conducted Transmitter Output Power	Compliant
§15.407 (a)	Power Spectral Density	Compliant
§15.407 (h)	Transmit Power Control (TPC)	Not Applicable
§15.407 (h)	Dynamic Frequency Selection (DFS)	Not Applicable*

Not Applicable: the EUT has no TPC function which was declarded by the applicant.
Not Applicable*: the EUT not operating within frequency range of 5250-5350MHz&5470-5725MHz.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde& Schwarz	EMI Test Receiver	ESCI	100784	2021/12/13	2022/12/12
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2021/12/13	2022/12/12
Rohde & Schwarz	Absorbing Clamp	MDS21	100142	2021/12/22	2022/12/21
Unknown	RF Coaxial Cable	No.17	N0350	2021/12/14	2022/12/13
Conducted Emission Test Software: e3 19821b (V9)					
Radiated Emissions Test					
Rohde& Schwarz	Test Receiver	ESR	102725	2021/12/13	2022/12/12
Rohde&Schwarz	Spectrum Analyzer	FSV40	101949	2021/12/13	2022/12/12
SONOMA INSTRUMENT	Amplifier	310 N	186131	2021/11/09	2022/11/08
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2021/11/09	2022/11/08
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2021/11/11	2022/11/10
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2020/01/05	2023/01/04
Radiated Emission Test Software: e3 19821b (V9)					
Unknown	RF Coaxial Cable	No.10	N050	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.11	N1000	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.12	N040	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.13	N300	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.14	N800	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.15	N600	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.16	N650	2021/12/14	2022/12/13
CD	Band Reject Filter	BRM-5.15/5.35g-45	075	2021/12/14	2022/12/13
CD	Band Reject Filter	BRM-5.725/5.875G-45	065	2021/12/14	2022/12/13

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde&Schwarz	Spectrum Analyzer	FSV-40	101948	2021/12/13	2022/12/12
Tonscend	RF Control Unit	JS0806-2	19G8060182	2021/10/26	2022/10/25
WEINSCHEL	10dB Attenuator	5324	AU 3842	2021/12/14	2022/12/13
Unknown	RF Cable	Unknown	1	Each time	/

*** Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §15.407(f)& §1.1310 & §2.1091 – MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to KDB 447498 D04 Interim General RF Exposure Guidance v01, clause 2.1.4 –MPE-Based Exemption:

An alternative to the SAR-based exemption is provided in §1.1307(b)(3)(i)(C), for a much wider frequency range, from 300 kHz to 100 GHz, applicable for separation distances greater or equal to $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. The MPE-based test exemption condition is in terms of ERP, defined as the product of the maximum antenna gain and the delivered maximum time-averaged power. For this case, a RF source is an RF exempt device if its ERP (watts) is no more than a frequency-dependent value, as detailed tabular form in Appendix B. These limits have been derived based on the basic specifications on Maximum Permissible Exposure (MPE) considered for the FCC rules in §1.1310(e)(1).

Table to §1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1,920 R^2.
1.34-30	3,450 R^2/f^2.
30-300	3.83 R^2.
300-1,500	0.0128 R^2f.
1,500-100,000	19.2R^2.

f = frequency in MHz;
R = minimum separation distance from the body of a nearby person (appropriate units, e.g., m);

Test result

For worst case:

Mode	Frequency Range (MHz)	Tune-up Output Power		Antenna Gain		ERP		Evaluation Distance (cm)	MPE-Based Exemption Threshold (W)
		(dBm)	(W)	(dBi)	(dBd)	(dBm)	(W)		
Wi-Fi	2412-2472	13	0.020	2.19	0.04	13.04	0.020	20	0.768
	5150-5250	11.5	0.014	3.27	1.12	12.62	0.018	20	0.768
	5725-5850	12.5	0.018	3.27	1.12	13.62	0.023	20	0.768

Note 1: The tune-up power and antenna gain was declared by the applicant.
Note 2: The 2.4GHz Wi-Fi cannot transmit at same time with 5GHz Wi-Fi.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliant.

FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.407 (a), if the transmitting antennas of directional gain greater than 6dBi are used, the transmit power and power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has one internal antenna arrangement for 5G Wi-Fi which were permanently attached. Please refer to the EUT photos.

Type	Antenna Gain	Impedance	Frequency Range
FPC	3.27dBi	50Ω	5150-5850MHz

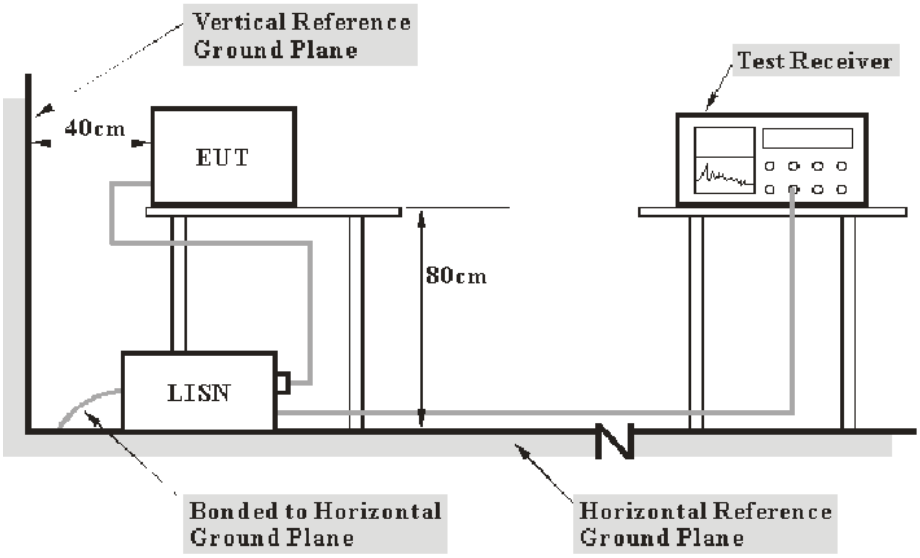
Result: Compliant.

FCC §15.407 (b) (6) §15.207 (a) – CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207, §15.407(b) (6)

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and Average detection mode.

Corrected Factor & Margin Calculation

The Transd factor is calculated by adding LISN VDF (Voltage Division Factor) and Cable Loss. The basic equation is as follows:

Transd Factor = LISN VDF + Cable Loss

The "**Over limit**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over limit of -7 dB means the emission is 7 dB below the limit. The equation for calculation is as follows:

Over Limit = Level – Limit
Level = Read Level + Factor

Test Data

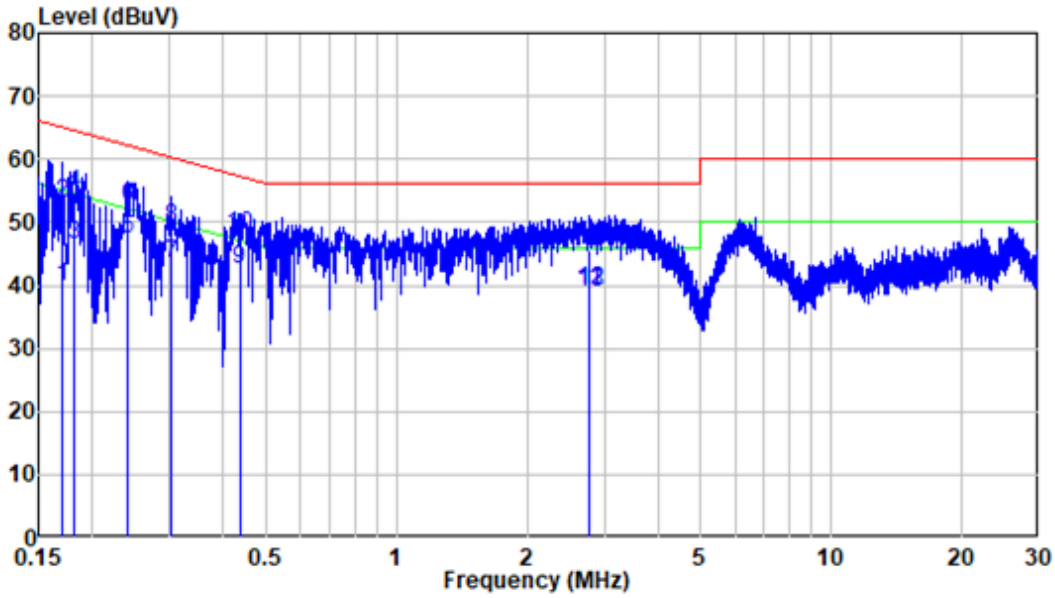
Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	49 %
ATM Pressure:	101.0 kPa

The testing was performed by Jason on 2022-08-11.

EUT operation mode: Transmitting (worst case is 802.11n20, 5745MHz)

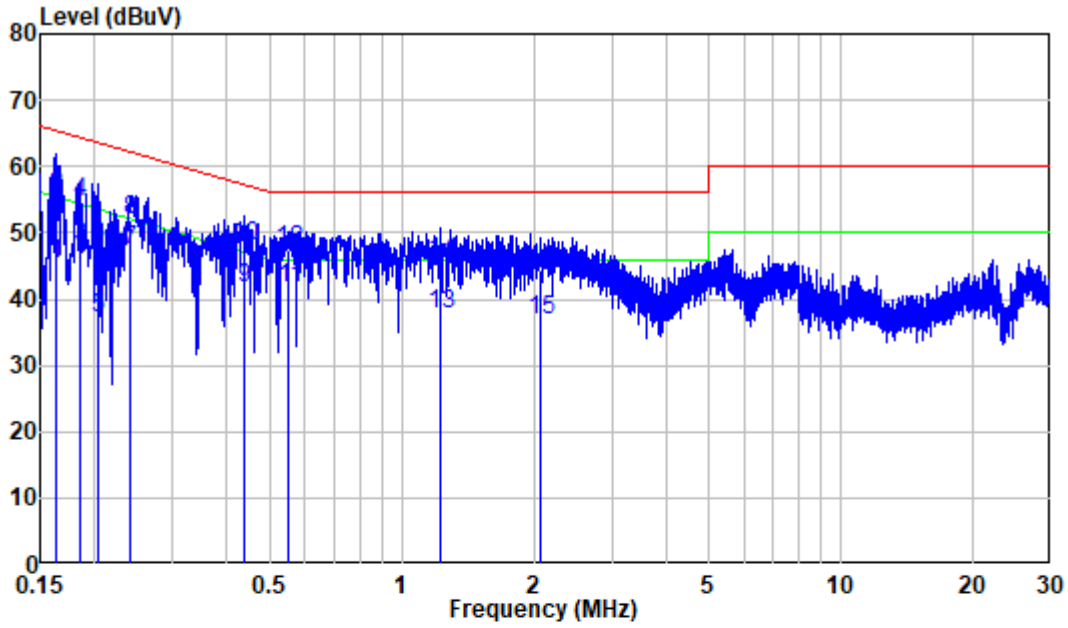
AC 120V/60 Hz, Line:



Site : Shielding Room
Condition: Line
Mode : 5G WIFI
Model : Leisure 470Pro
Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.170	9.80	30.18	39.98	54.97	-14.99	Average
2	0.170	9.80	43.48	53.28	64.97	-11.69	QP
3	0.181	9.80	36.69	46.49	54.43	-7.94	Average
4	0.181	9.80	44.81	54.61	64.43	-9.82	QP
5	0.240	9.80	37.53	47.33	52.09	-4.76	Average
6	0.240	9.80	42.83	52.63	62.09	-9.46	QP
7	0.303	9.80	33.61	43.41	50.16	-6.75	Average
8	0.303	9.80	39.32	49.12	60.16	-11.04	QP
9	0.435	9.80	32.85	42.65	47.15	-4.50	Average
10	0.435	9.80	38.21	48.01	57.15	-9.14	QP
11	2.772	9.83	29.41	39.24	46.00	-6.76	Average
12	2.772	9.83	29.41	39.24	46.00	-6.76	Average
13	2.772	9.83	29.20	39.03	46.00	-6.97	Average
14	2.772	9.83	35.68	45.51	56.00	-10.49	QP

AC 120V/60 Hz, Neutral:



Site : Shielding Room
Condition: Neutral
Mode : 5G WIFI
Model : Leisure 470Pro
Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.163	9.80	35.56	45.36	55.32	-9.96	Average
2	0.163	9.80	45.85	55.65	65.32	-9.67	QP
3	0.185	9.80	38.16	47.96	54.26	-6.30	Average
4	0.185	9.80	44.71	54.51	64.26	-9.75	QP
5	0.203	9.80	27.19	36.99	53.49	-16.50	Average
6	0.203	9.80	38.14	47.94	63.49	-15.55	QP
7	0.241	9.80	37.73	47.53	52.08	-4.55	Average
8	0.241	9.80	42.12	51.92	62.08	-10.16	QP
9	0.438	9.80	31.96	41.76	47.11	-5.35	Average
10	0.438	9.80	38.23	48.03	57.11	-9.08	QP
11	0.553	9.81	31.96	41.77	46.00	-4.23	Average
12	0.553	9.81	37.47	47.28	56.00	-8.72	QP
13	1.219	9.81	27.84	37.65	46.00	-8.35	Average
14	1.219	9.81	35.78	45.59	56.00	-10.41	QP
15	2.063	9.82	27.05	36.87	46.00	-9.13	Average
16	2.063	9.82	34.56	44.38	56.00	-11.62	QP

§15.205 & §15.209 & §15.407(B)– UNDESIRABLE EMISSION

Applicable Standard

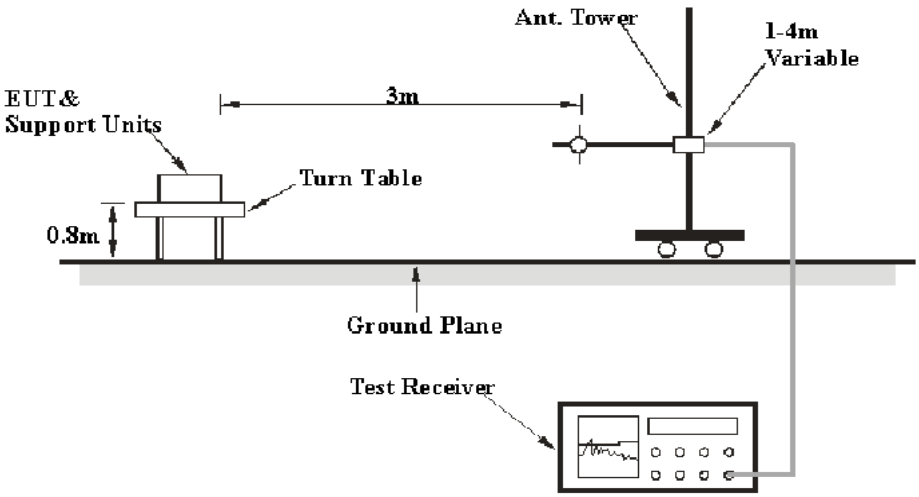
FCC §15.407 (b); §15.209; §15.205;

(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(4) For transmitters operating in the 5.725-5.85 GHz band:
(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

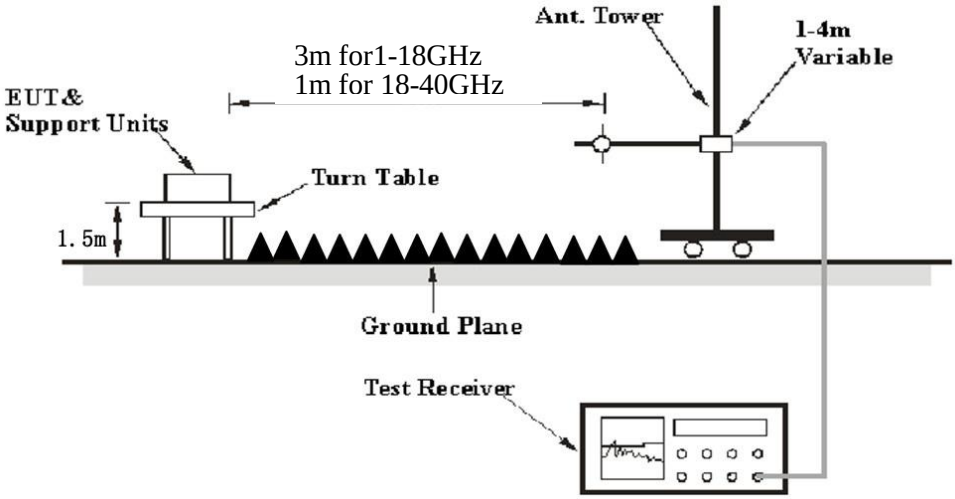
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

EUT Setup

Below 1 GHz:



Above 1 GHz:



The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC 15.209 and FCC 15.407 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	PK
	1MHz	10 Hz Note 1	/	Average
	1MHz	＞1/T Note 2	/	Average

Note 1: when duty cycle is no less than 98%
Note 2: when duty cycle is less than 98%

Test Procedure

Radiated Spurious Emission

During the radiated emission test, the adapter was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all the installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1GHz, peak and Average detection modes for frequencies above 1GHz.

According to ANSI C63.10-2013,9.4: For field strength measurements made at other than the distance at which the applicable limit is specified,extrapolate the measured field strength to the field strength at the distance specified by the limit using an inverse distance correction factor (20 dB/decade of distance). In some cases, a different distance correction factor may be required;

$$E_{\mathrm{SpecLimit}} = E_{\mathrm{Meas}} + 20\log\left(\frac{d_{\mathrm{Meas}}}{d_{\mathrm{SpecLimit}}}\right)$$

where

$E_{\mathrm{SpecLimit}}$	is the field strength of the emission at the distance specified by the limit, in dBμV/m
E_{Meas}	is the field strength of the emission at the measurement distance, in dBμV/m
d_{Meas}	is the measurement distance, in m
$d_{\mathrm{SpecLimit}}$	is the distance specified by the limit, in m

So the extrapolation factor of 1m is 20*log(1/3)= -9.5 dB

Factor & Margin Calculation

The Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain. The basic equation is as follows:

Factor = Antenna Factor + Cable Loss - Amplifier Gain

The "**Over Limit/Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit/margin of -7dB means the emission is 7dB below the limit. The equation for calculation is as follows:

Over Limit/Margin = Level / Corrected Amplitude – Limit
Level / Corrected Amplitude = Read Level + Factor

Test Data

Environmental Conditions

Temperature:	27.8~28 ℃
Relative Humidity:	55~68 %
ATM Pressure:	101.0 kPa

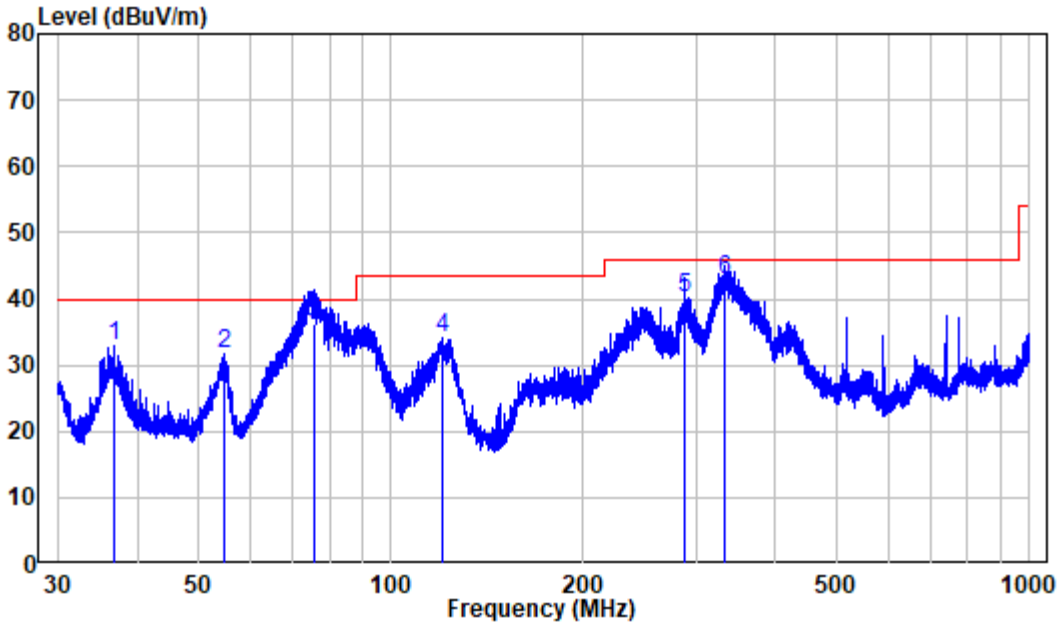
The testing was performed by Level on 2022-08-11 for below 1GHz and by Level Li on 2022-08-04 for above 1GHz.

EUT operation mode: Transmitting

30 MHz – 1 GHz: *(worst case is 802.11n20, 5745MHz)*

Note: When the test result of Peak was more than 6dB below the limit of QP, just the Peak value was recorded.

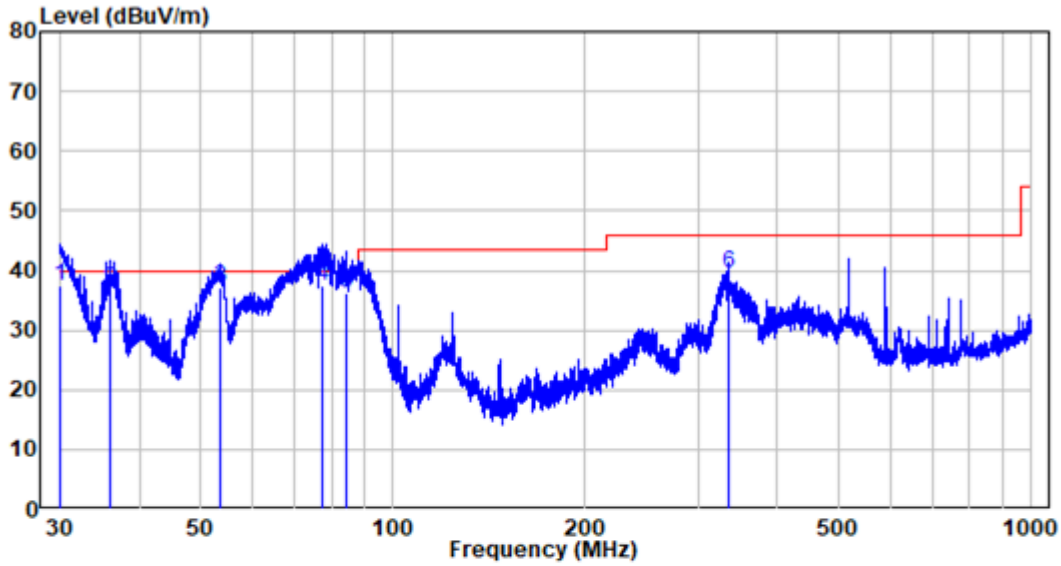
Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No. : SZNS220606-24734E-RF
Test Mode: 5G WIFI

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	36.734	-11.06	43.93	32.87	40.00	-7.13	Peak
2	54.691	-10.31	42.10	31.79	40.00	-8.21	Peak
3	75.711	-16.36	52.70	36.34	40.00	-3.66	QP
4	120.066	-13.54	47.52	33.98	43.50	-9.52	Peak
5	287.990	-9.36	49.60	40.24	46.00	-5.76	QP
6	332.810	-7.78	50.70	42.92	46.00	-3.08	QP

Vertical



Site : chamber
Condition: 3m VERTICAL
Job No. : SZNS220606-24734E-RF
Test Mode: 5G WIFI

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	30.158	-12.38	49.85	37.47	40.00	-2.53	QP
2	36.064	-11.18	47.89	36.71	40.00	-3.29	QP
3	53.646	-10.28	47.47	37.19	40.00	-2.81	QP
4	77.355	-16.55	54.01	37.46	40.00	-2.54	QP
5	84.184	-15.97	52.24	36.27	40.00	-3.73	QP
6	335.741	-7.59	47.08	39.49	46.00	-6.51	QP

Above 1GHz:

5150-5250 MHz:

Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	PK/QP/AV	Angle Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11a									
5180 MHz									
4500	64.03	PK	226	1.2	H	-4.72	59.31	74	-14.69
4500	50.41	AV	226	1.2	H	-4.72	45.69	54	-8.31
4500	63.66	PK	255	2	V	-4.72	58.94	74	-15.06
4500	50.5	AV	255	2	V	-4.72	45.78	54	-8.22
5150	64.66	PK	236	2	H	-2.73	61.93	74	-12.07
5150	50.16	AV	236	2	H	-2.73	47.43	54	-6.57
5150	65.06	PK	302	1.6	V	-2.73	62.33	74	-11.67
5150	49.82	AV	302	1.6	V	-2.73	47.09	54	-6.91
10360	56.39	PK	176	1.8	H	8.12	64.51	68.2	-3.69
10360	47.66	PK	55	2.3	V	8.12	55.78	68.2	-12.42
5200 MHz									
10400	56.54	PK	18	1	H	8.24	64.78	68.2	-3.42
10400	48.09	PK	262	2.2	V	8.24	56.33	68.2	-11.87
5240 MHz									
5350	65.2	PK	111	1.2	H	-2.33	62.87	74	-11.13
5350	51.67	AV	111	1.2	H	-2.33	49.34	54	-4.66
5350	64.92	PK	318	2.5	V	-2.33	62.59	74	-11.41
5350	51.73	AV	318	2.5	V	-2.33	49.4	54	-4.6
5460	63.6	PK	224	2	H	-2.26	61.34	74	-12.66
5460	50.99	AV	224	2	H	-2.26	48.73	54	-5.27
5460	63.36	PK	53	2.5	V	-2.26	61.1	74	-12.9
5460	50.87	AV	53	2.5	V	-2.26	48.61	54	-5.39
10480	56.82	PK	286	1.3	H	8.56	65.38	68.2	-2.82
10480	47.63	PK	245	1.9	V	8.56	56.19	68.2	-12.01

Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	PK/QP/AV	Angle Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11n20									
5180 MHz									
4500	63.93	PK	212	1.4	H	-4.72	59.21	74	-14.79
4500	50.49	AV	212	1.4	H	-4.72	45.77	54	-8.23
4500	63.95	PK	357	2	V	-4.72	59.23	74	-14.77
4500	50.38	AV	357	2	V	-4.72	45.66	54	-8.34
5150	65.07	PK	63	2.4	H	-2.73	62.34	74	-11.66
5150	50.56	AV	63	2.4	H	-2.73	47.83	54	-6.17
5150	64.95	PK	109	1.3	V	-2.73	62.22	74	-11.78
5150	49.79	AV	109	1.3	V	-2.73	47.06	54	-6.94
10360	56.42	PK	344	2.1	H	8.12	64.54	68.2	-3.66
10360	48.14	PK	48	2.1	V	8.12	56.26	68.2	-11.94
5200 MHz									
10400	56.74	PK	126	2	H	8.24	64.98	68.2	-3.22
10400	48.64	PK	231	1.9	V	8.24	56.88	68.2	-11.32
5240 MHz									
5350	64.16	PK	293	2.1	H	-2.33	61.83	74	-12.17
5350	51.05	AV	293	2.1	H	-2.33	48.72	54	-5.28
5350	63.93	PK	21	1.1	V	-2.33	61.6	74	-12.4
5350	51.39	AV	21	1.1	V	-2.33	49.06	54	-4.94
5460	63.15	PK	229	2.1	H	-2.26	60.89	74	-13.11
5460	50.89	AV	229	2.1	H	-2.26	48.63	54	-5.37
5460	63.6	PK	74	1.1	V	-2.26	61.34	74	-12.66
5460	50.88	AV	74	1.1	V	-2.26	48.62	54	-5.38
10480	57.13	PK	82	1.4	H	8.56	65.69	68.2	-2.51
10480	47.51	PK	262	1.1	V	8.56	56.07	68.2	-12.13

Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	PK/QP/AV	Angle Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11n40									
5190 MHz									
4500	63.99	PK	182	2.1	H	-4.72	59.27	74	-14.73
4500	50.31	AV	182	2.1	H	-4.72	45.59	54	-8.41
4500	63.58	PK	234	1.8	V	-4.72	58.86	74	-15.14
4500	50.27	AV	234	1.8	V	-4.72	45.55	54	-8.45
5150	63.98	PK	28	2.2	H	-2.73	61.25	74	-12.75
5150	50.57	AV	28	2.2	H	-2.73	47.84	54	-6.16
5150	63.09	PK	42	1.9	V	-2.73	60.36	74	-13.64
5150	49.86	AV	42	1.9	V	-2.73	47.13	54	-6.87
10380	44.35	PK	34	1.9	H	8.18	52.53	68.2	-15.67
10380	43.16	PK	254	1.4	V	8.18	51.34	68.2	-16.86
5230 MHz									
5350	64.09	PK	286	1.2	H	-2.33	61.76	74	-12.24
5350	51.06	AV	286	1.2	H	-2.33	48.73	54	-5.27
5350	64	PK	323	1.4	V	-2.33	61.67	74	-12.33
5350	51.26	AV	323	1.4	V	-2.33	48.93	54	-5.07
5460	63.59	PK	11	1.7	H	-2.26	61.33	74	-12.67
5460	50.9	AV	11	1.7	H	-2.26	48.64	54	-5.36
5460	63.33	PK	284	1.6	V	-2.26	61.07	74	-12.93
5460	50.84	AV	284	1.6	V	-2.26	48.58	54	-5.42
10460	43.63	PK	319	1.8	H	8.47	52.1	68.2	-16.1
10460	42.61	PK	169	1.7	V	8.47	51.08	68.2	-17.12

5725-5850 MHz:

Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	Detector (PK/QP/AV)	Angle Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11a									
5745 MHz									
5650	65.42	PK	167	1.7	H	-1.95	63.47	68.2	-4.73
5700	65.09	PK	123	2.4	H	-2.02	63.07	105.2	-42.13
5720	66.39	PK	239	2.1	H	-1.97	64.42	110.8	-46.38
5725	71	PK	69	2	H	-1.96	69.04	122.2	-53.16
5650	65.07	PK	243	2.2	V	-1.95	63.12	68.2	-5.08
5700	65.02	PK	103	2.5	V	-2.02	63	105.2	-42.2
5720	65.97	PK	109	2.2	V	-1.97	64	110.8	-46.8
5725	69.06	PK	42	1.1	V	-1.96	67.1	122.2	-55.1
11490	58.17	PK	144	1.5	H	6.63	64.8	74	-9.2
11490	42.34	AV	144	1.5	H	6.63	48.97	54	-5.03
11490	51.36	PK	352	1.8	V	6.63	57.99	74	-16.01
11490	38.02	AV	352	1.8	V	6.63	44.65	54	-9.35
5785 MHz									
11570	55.21	PK	76	1.2	H	6.59	61.8	74	-12.2
11570	40.69	AV	76	1.2	H	6.59	47.28	54	-6.72
11570	50.87	PK	34	2.1	V	6.59	57.46	74	-16.54
11570	38.28	AV	34	2.1	V	6.59	44.87	54	-9.13
5825 MHz									
5850	70.43	PK	274	1.4	H	-1.81	68.62	122.2	-53.58
5855	66.65	PK	49	2.2	H	-1.82	64.83	110.8	-45.97
5875	65.61	PK	165	2.2	H	-1.84	63.77	105.2	-41.43
5925	65.97	PK	238	2.4	H	-1.82	64.15	68.2	-4.05
5850	69.31	PK	13	2.2	V	-1.81	67.5	122.2	-54.7
5855	66.33	PK	141	2.4	V	-1.82	64.51	110.8	-46.29
5875	65.86	PK	72	1.7	V	-1.84	64.02	105.2	-41.18
5925	65.55	PK	348	2.5	V	-1.82	63.73	68.2	-4.47
11650	52.78	PK	80	1.8	H	6.77	59.55	74	-14.45
11650	39.03	AV	80	1.8	H	6.77	45.8	54	-8.2
11650	49.36	PK	288	2.2	V	6.77	56.13	74	-17.87
11650	36.88	AV	288	2.2	V	6.77	43.65	54	-10.35

Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	Detector (PK/QP/AV)	Angle Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11n20									
5745 MHz									
5650	65.17	PK	161	1	H	-1.95	63.22	68.2	-4.98
5700	65.23	PK	358	2.1	H	-2.02	63.21	105.2	-41.99
5720	66.03	PK	128	1.8	H	-1.97	64.06	110.8	-46.74
5725	71.04	PK	352	1.8	H	-1.96	69.08	122.2	-53.12
5650	65.24	PK	36	1.9	V	-1.95	63.29	68.2	-4.91
5700	65.12	PK	167	2.1	V	-2.02	63.1	105.2	-42.1
5720	66.37	PK	285	1.6	V	-1.97	64.4	110.8	-46.4
5725	68.96	PK	77	2	V	-1.96	67	122.2	-55.2
11490	55.51	PK	191	1.3	H	6.63	62.14	74	-11.86
11490	41.45	AV	191	1.3	H	6.63	48.08	54	-5.92
11490	50.69	PK	144	1.7	V	6.63	57.32	74	-16.68
11490	38.78	AV	144	1.7	V	6.63	45.41	54	-8.59
5785 MHz									
11570	55.57	PK	281	1.2	H	6.59	62.16	74	-11.84
11570	42.02	AV	281	1.2	H	6.59	48.61	54	-5.39
11570	51.21	PK	165	2	V	6.59	57.8	74	-16.2
11570	38.32	AV	165	2	V	6.59	44.91	54	-9.09
5825 MHz									
5850	70.28	PK	52	1.9	H	-1.81	68.47	122.2	-53.73
5855	66.67	PK	347	1.9	H	-1.82	64.85	110.8	-45.95
5875	65.92	PK	177	2	H	-1.84	64.08	105.2	-41.12
5925	66.03	PK	175	1.6	H	-1.82	64.21	68.2	-3.99
5850	69.44	PK	335	2.2	V	-1.81	67.63	122.2	-54.57
5855	66.34	PK	111	1.1	V	-1.82	64.52	110.8	-46.28
5875	65.65	PK	146	1.3	V	-1.84	63.81	105.2	-41.39
5925	66.23	PK	193	1.1	V	-1.82	64.41	68.2	-3.79
11650	53.62	PK	281	2.5	H	6.77	60.39	74	-13.61
11650	40.21	AV	281	2.5	H	6.77	46.98	54	-7.02
11650	49.46	PK	73	2.3	V	6.77	56.23	74	-17.77
11650	36.52	AV	73	2.3	V	6.77	43.29	54	-10.71

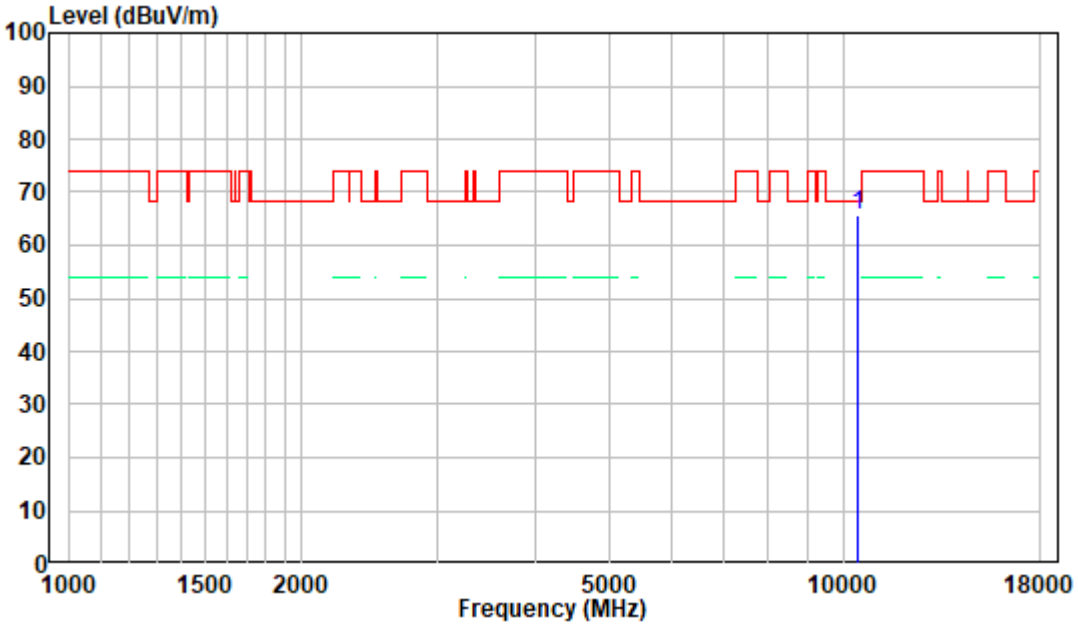
Frequency (MHz)	Receiver		Turn-Table	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	FCC Part 15.407	
	Reading (dBμV)	Detector (PK/QP/AV)	Angle Degree	Height (m)	Polar (H / V)			Limit (dBμV/m)	Margin (dB)
802.11n40									
5755 MHz									
5650	65.07	PK	280	2.4	H	-1.95	63.12	68.2	-5.08
5700	65.37	PK	298	1.1	H	-2.02	63.35	105.2	-41.85
5720	66.12	PK	305	2.3	H	-1.97	64.15	110.8	-46.65
5725	69.42	PK	207	2.1	H	-1.96	67.46	122.2	-54.74
5650	65.19	PK	274	1.3	V	-1.95	63.24	68.2	-4.96
5700	65.13	PK	118	1.9	V	-2.02	63.11	105.2	-42.09
5720	65.97	PK	57	2.2	V	-1.97	64	110.8	-46.8
5725	68.3	PK	69	2.4	V	-1.96	66.34	122.2	-55.86
11510	53.79	PK	151	1.7	H	6.59	60.38	74	-13.62
11510	39.31	AV	151	1.7	H	6.59	45.9	54	-8.1
11510	49.24	PK	129	2.1	V	6.59	55.83	74	-18.17
11510	33.88	AV	129	2.1	V	6.59	40.47	54	-13.53
5795 MHz									
5850	69.44	PK	301	1.4	H	-1.81	67.63	122.2	-54.57
5855	66.4	PK	4	1.2	H	-1.82	64.58	110.8	-46.22
5875	66.12	PK	153	2.3	H	-1.84	64.28	105.2	-40.92
5925	65.97	PK	104	1.1	H	-1.82	64.15	68.2	-4.05
5850	69.62	PK	319	1.2	V	-1.81	67.81	122.2	-54.39
5855	66.39	PK	355	1.8	V	-1.82	64.57	110.8	-46.23
5875	65.57	PK	26	2	V	-1.84	63.73	105.2	-41.47
5925	65.79	PK	12	1.2	V	-1.82	63.97	68.2	-4.23
11590	51.78	PK	299	2.4	H	6.57	58.35	74	-15.65
11590	36.97	AV	299	2.4	H	6.57	43.54	54	-10.46
11590	47.77	PK	238	1.8	V	6.57	54.34	74	-19.66
11590	34.33	AV	238	1.8	V	6.57	40.9	54	-13.1

Note:
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor
Corrected Amplitude = Corrected Factor + Reading
Margin = Corrected. Amplitude - Limit
The other spurious emission which is in the noise floor level was not recorded.

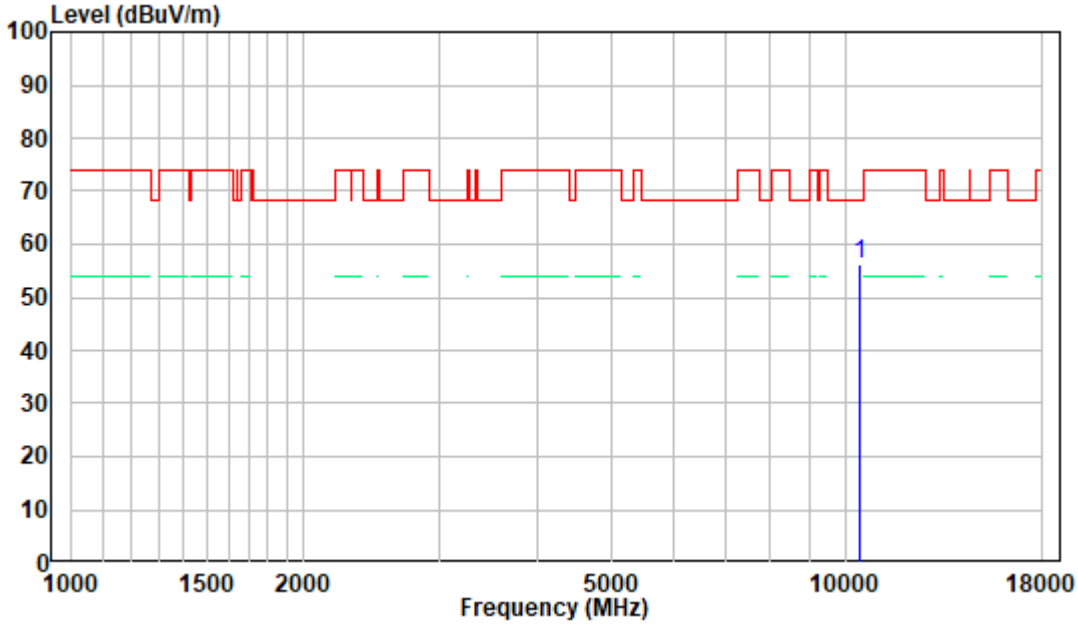
1 GHz - 18 GHz: (Pre-Scan plots)

802.11 a, 5745MHz

Horizontal



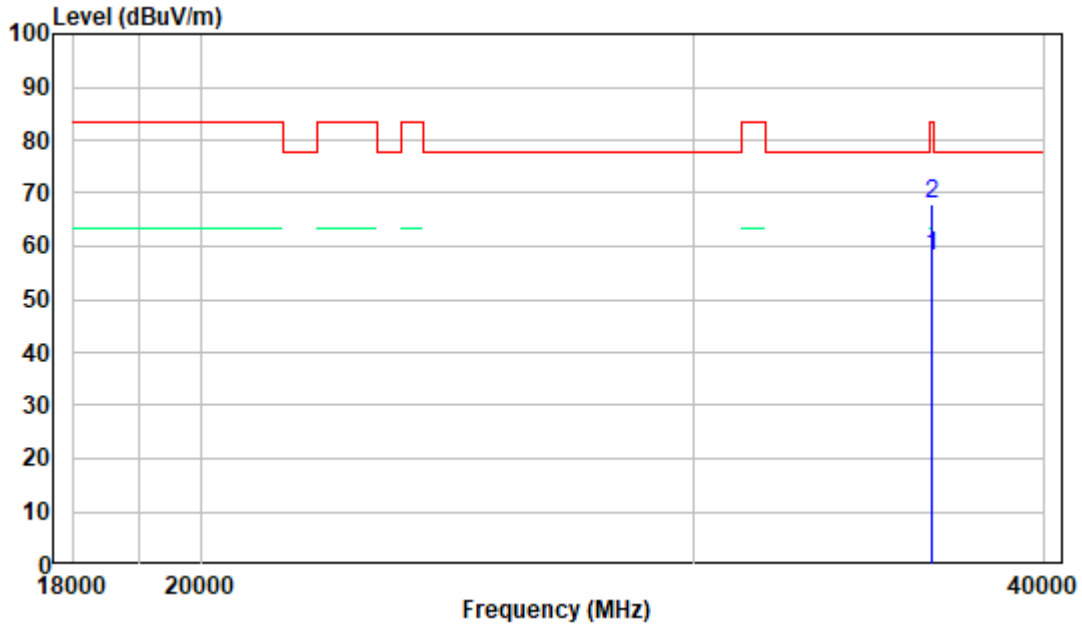
Vertical



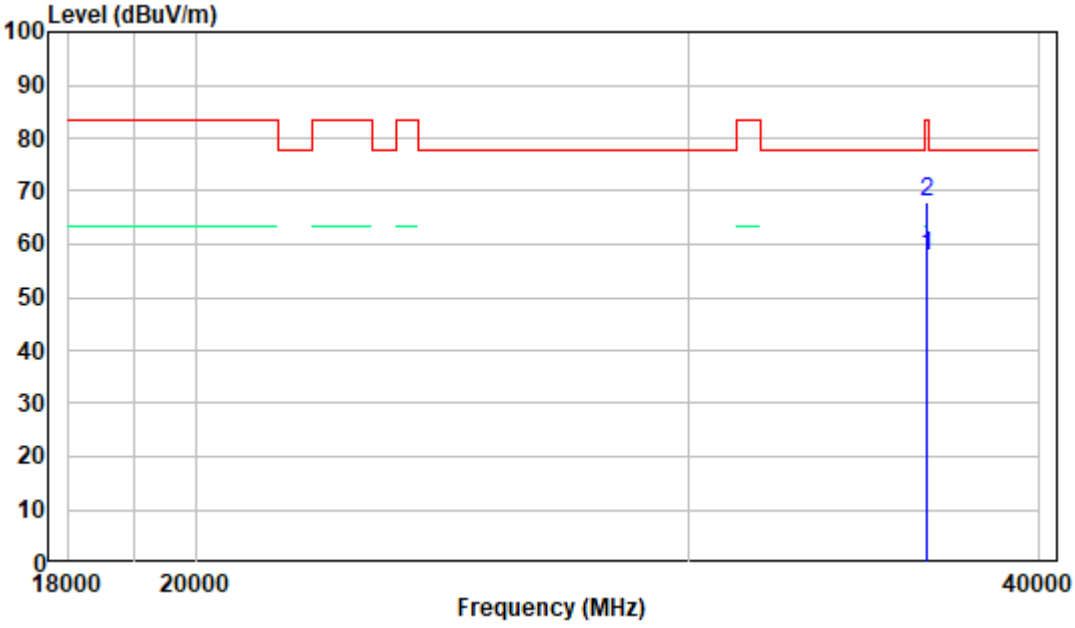
18-40GHz: (Pre-Scan plots)

802.11 a, 5745MHz

Horizontal



Vertical



FCC §15.407(a),(e) – 26 dB & 6dB EMISSION BANDWIDTH

Applicable Standard

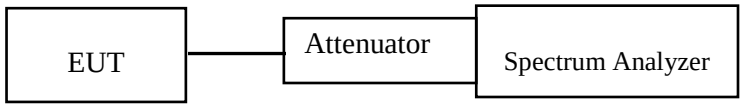
The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

1. Emission Bandwidth (EBW)
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

2. **Minimum Emission Bandwidth for the band 5.725-5.85 GHz**
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.725-5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



Test Data

Environmental Conditions

Temperature:	25.6 ℃
Relative Humidity:	62 %
ATM Pressure:	101.0 kPa

The testing was performed by Andy Yu on 2022-08-18.

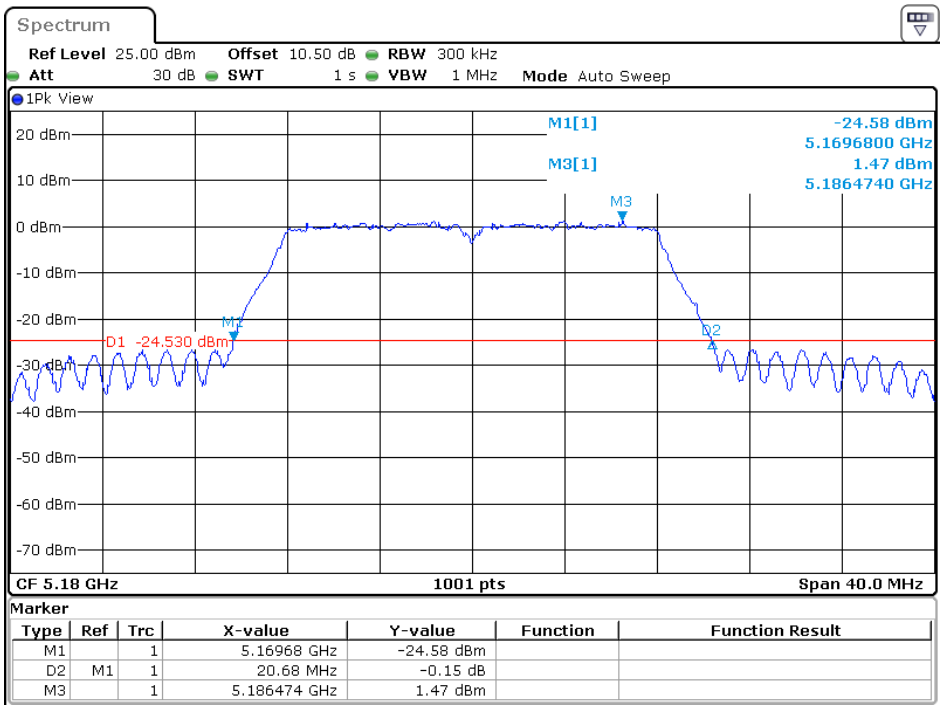
EUT operation mode: Transmitting

Test Result: Pass; please refer to the following tables and plots.

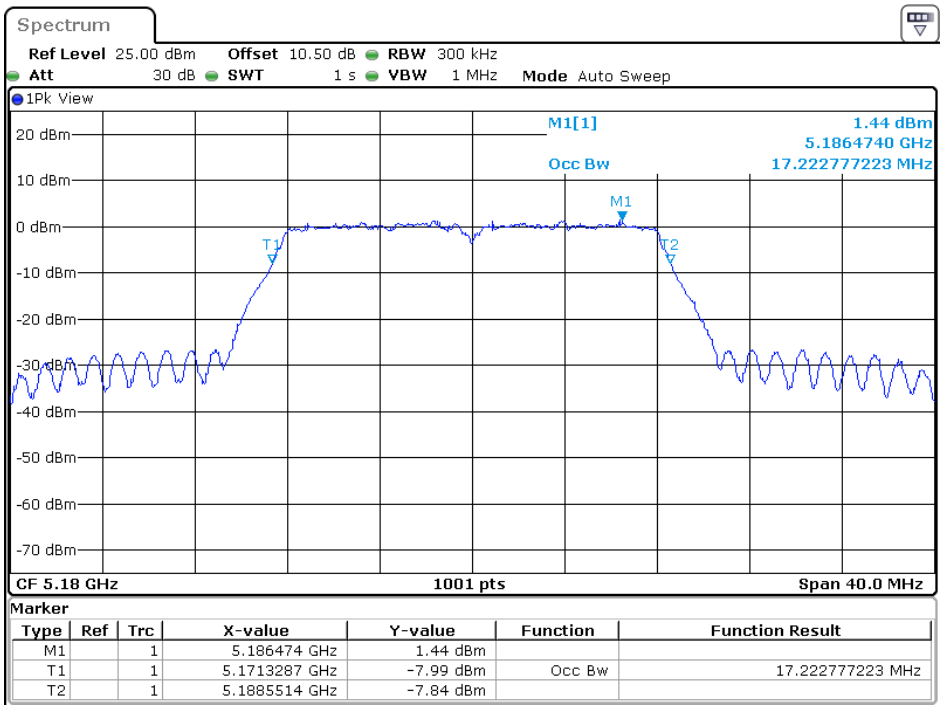
5150 MHz - 5250 MHz:

Frequency (MHz)	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)	Remark
802.11a			No transmitted signal in the 99% bandwidth extends into the U-NII-2A and
5180	20.68	17.22	
5200	20.80	17.22	
5240	20.72	17.22	
802.11n20			
5180	21.00	17.98	
5200	20.96	17.98	
5240	21.04	17.98	
802.11n40			
5190	41.28	36.60	
5230	41.20	36.52	

802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5180 MHz

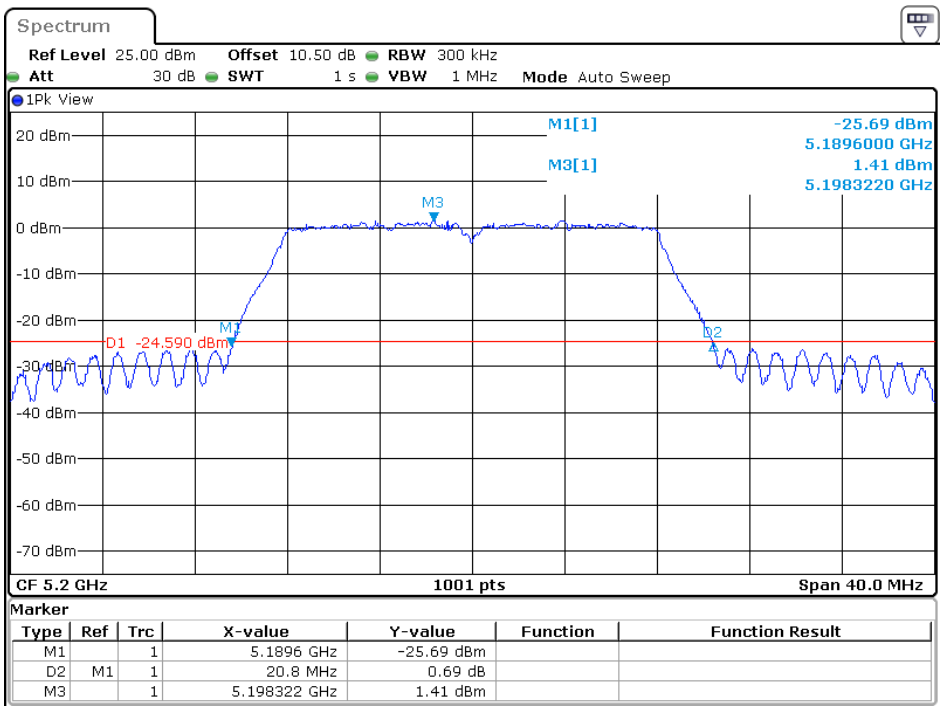


Date: 18.AUG.2022 20:33:47

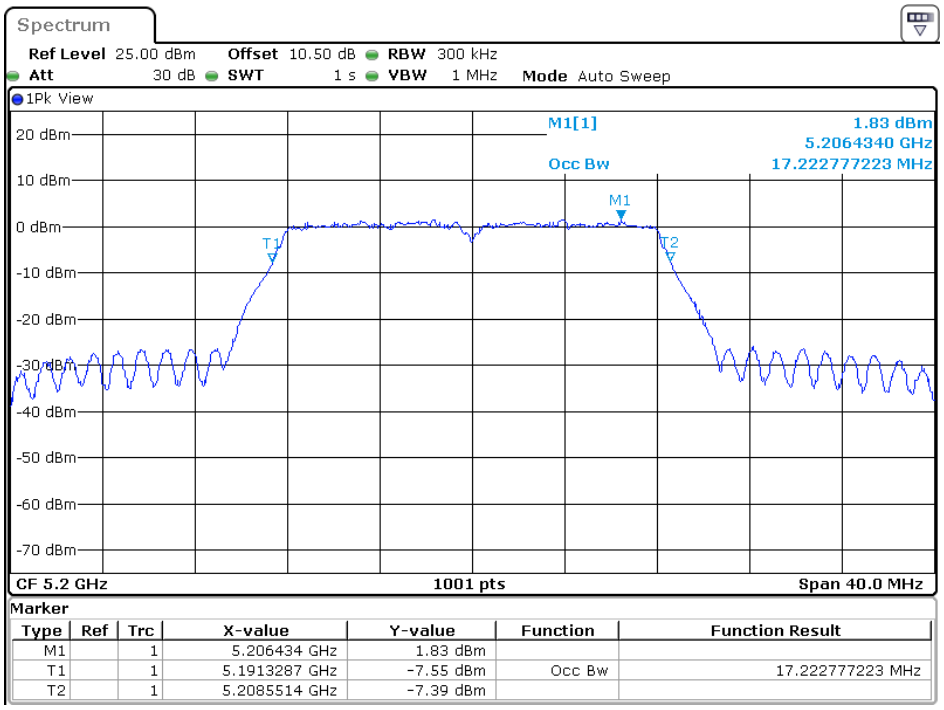


Date: 18.AUG.2022 20:33:17

802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5200 MHz

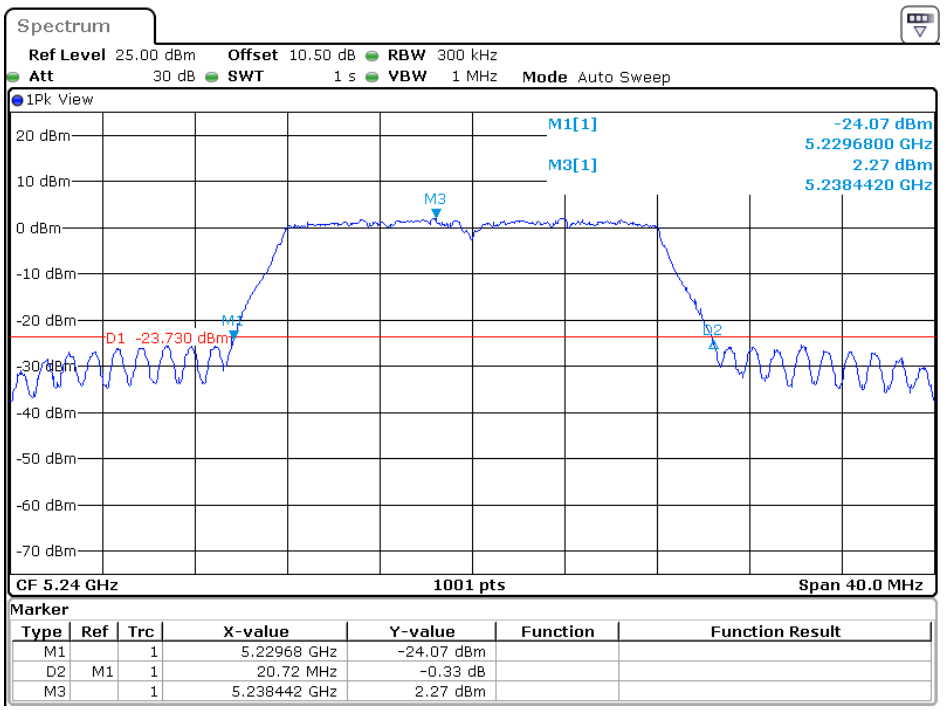


Date: 18.AUG.2022 20:37:02



Date: 18.AUG.2022 20:36:31

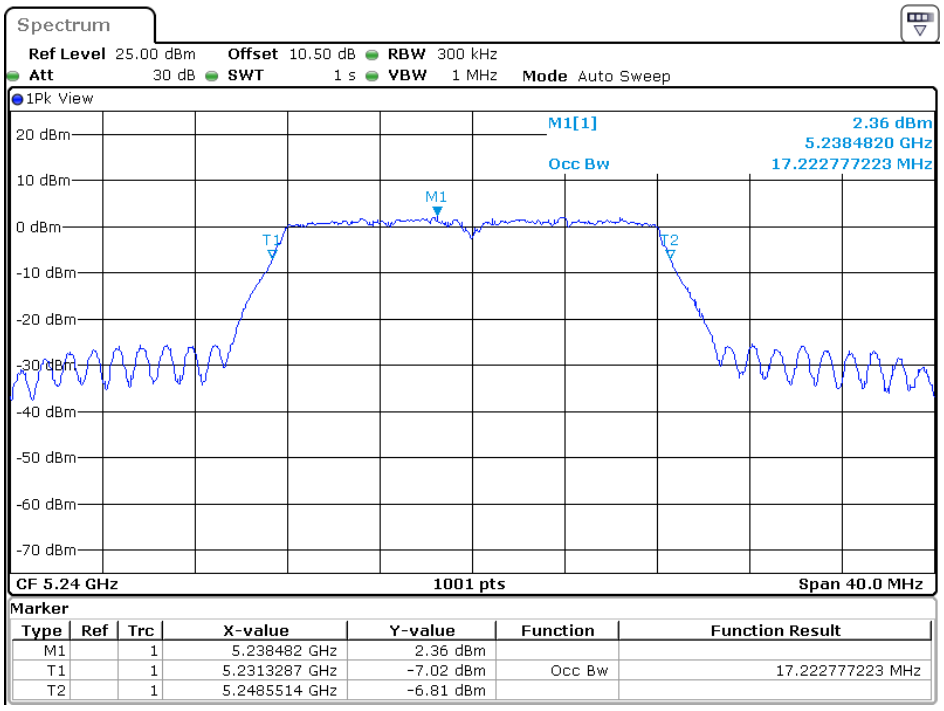
802.11a mode, 26 dB Emissions & 99% Occupied Bandwidth, 5240 MHz



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.22968 GHz	-24.07 dBm		
D2	M1	1	20.72 MHz	-0.33 dB		
M3		1	5.238442 GHz	2.27 dBm		

Date: 18.AUG.2022 20:40:01

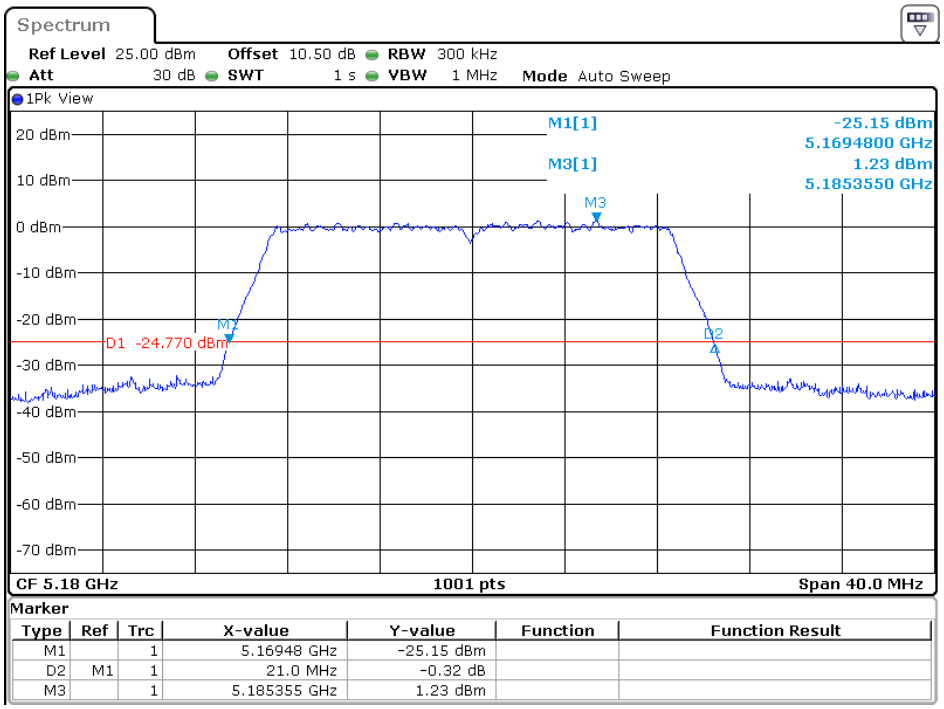


Marker

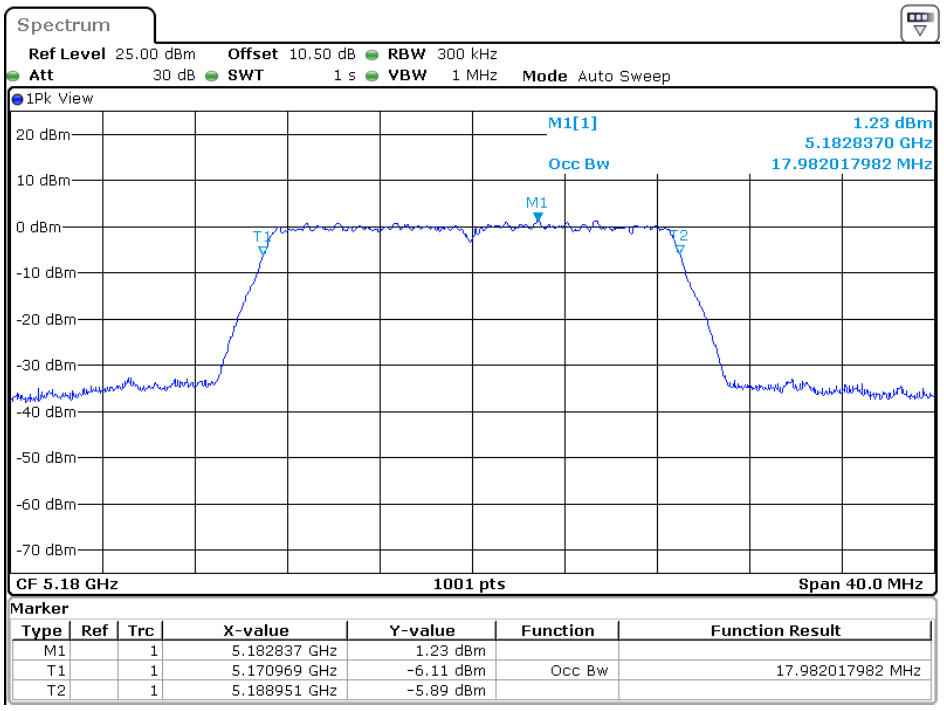
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.238482 GHz	2.36 dBm		
T1		1	5.2313287 GHz	-7.02 dBm	Occ Bw	17.222777223 MHz
T2		1	5.2485514 GHz	-6.81 dBm		

Date: 18.AUG.2022 20:39:32

802.11 n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5180 MHz

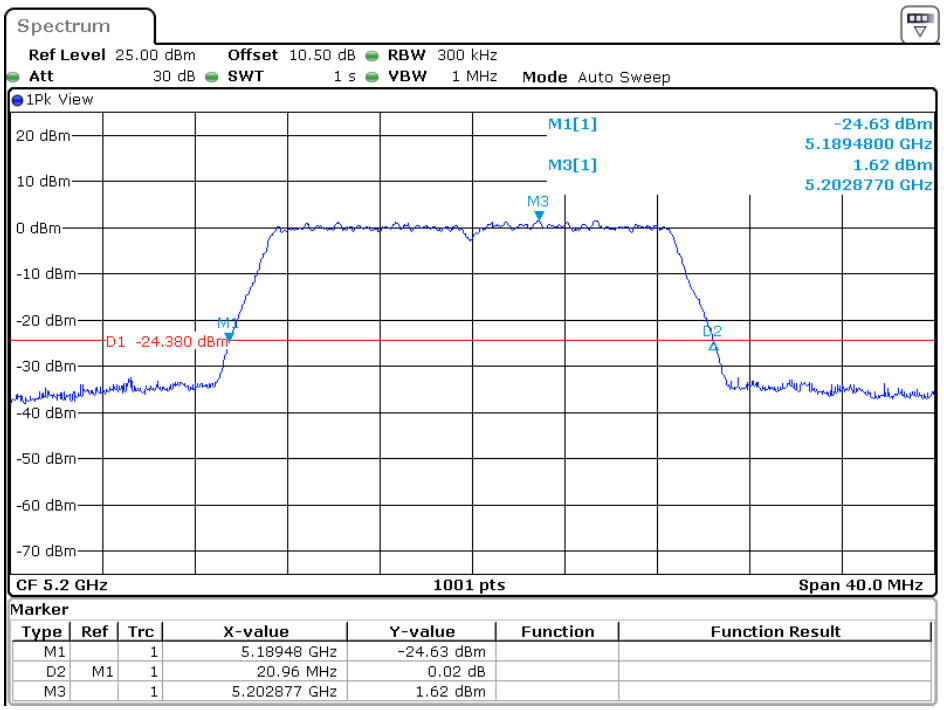


Date: 18.AUG.2022 20:43:20

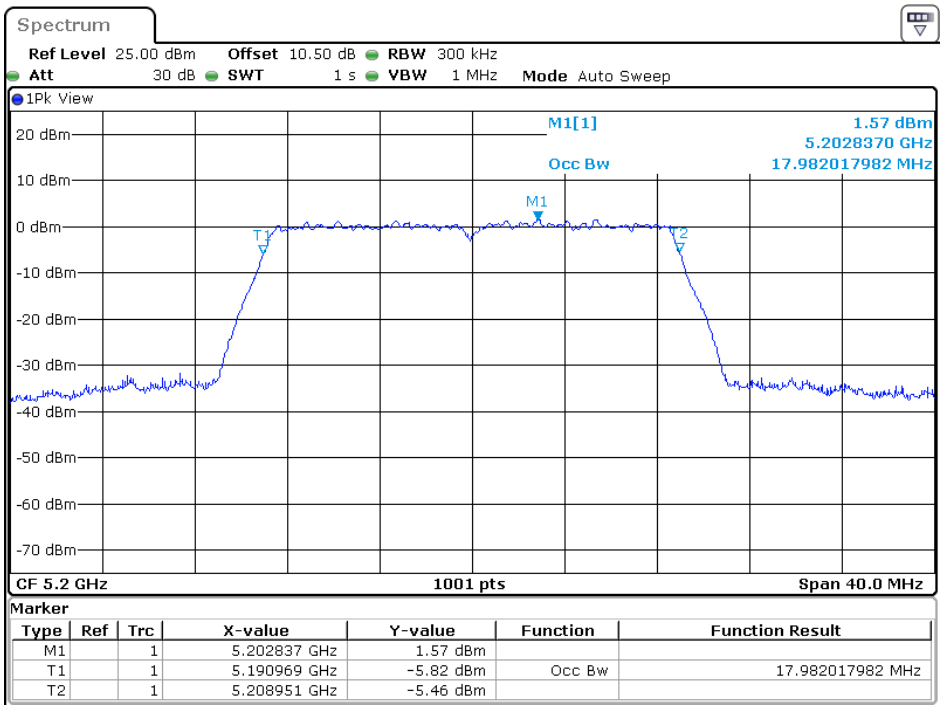


Date: 18.AUG.2022 20:42:50

802.11 n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5200 MHz

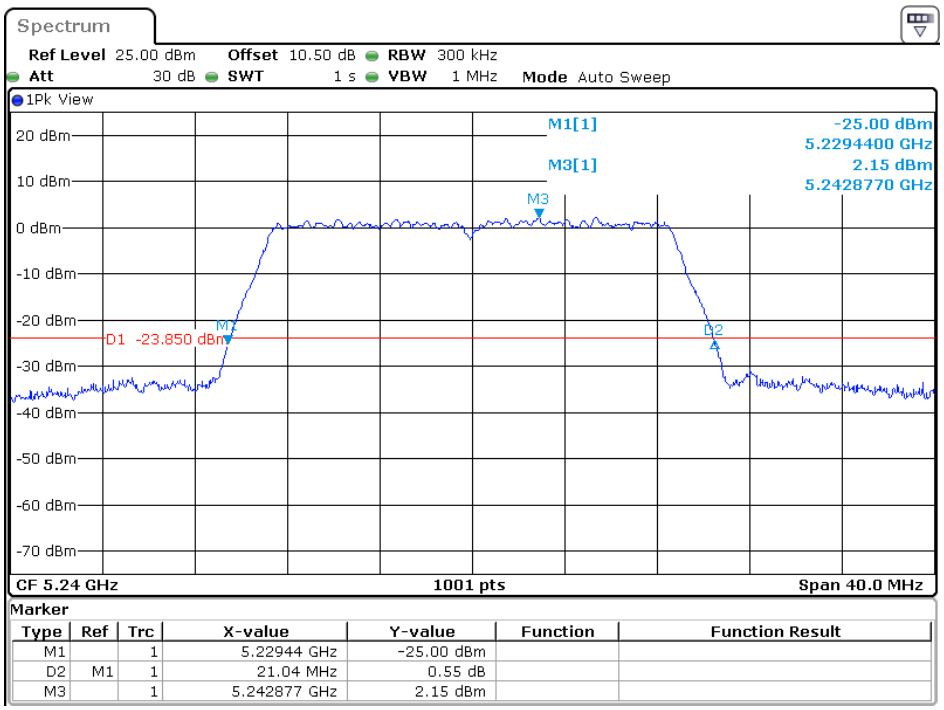


Date: 18.AUG.2022 20:46:17



Date: 18.AUG.2022 20:45:47

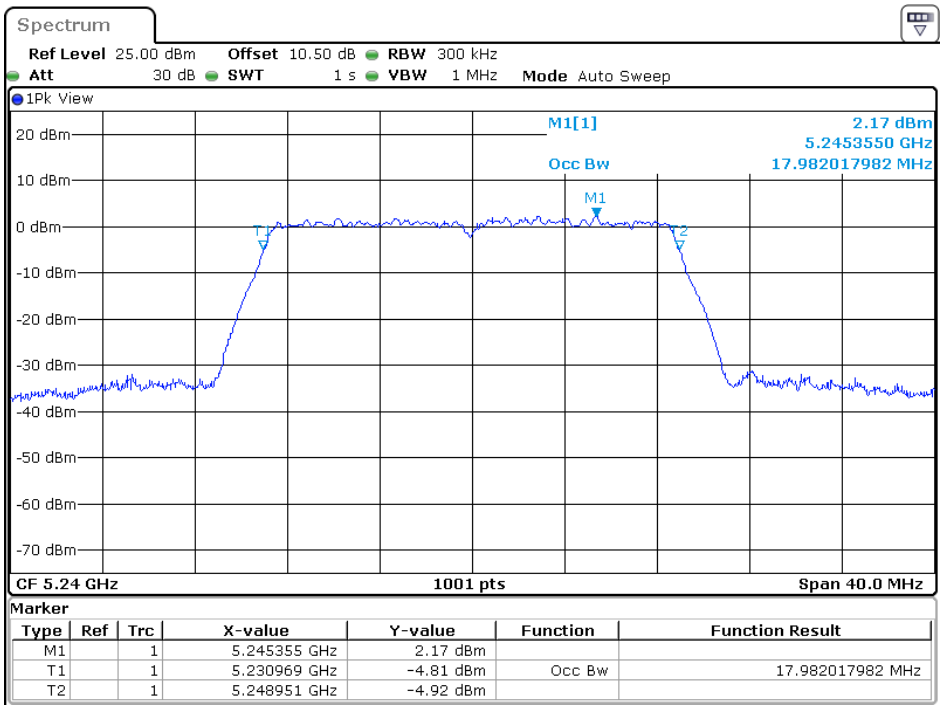
802.11n20 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5240 MHz



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.22944 GHz	-25.00 dBm		
D2	M1	1	21.04 MHz	0.55 dB		
M3		1	5.242877 GHz	2.15 dBm		

Date: 18.AUG.2022 20:48:58

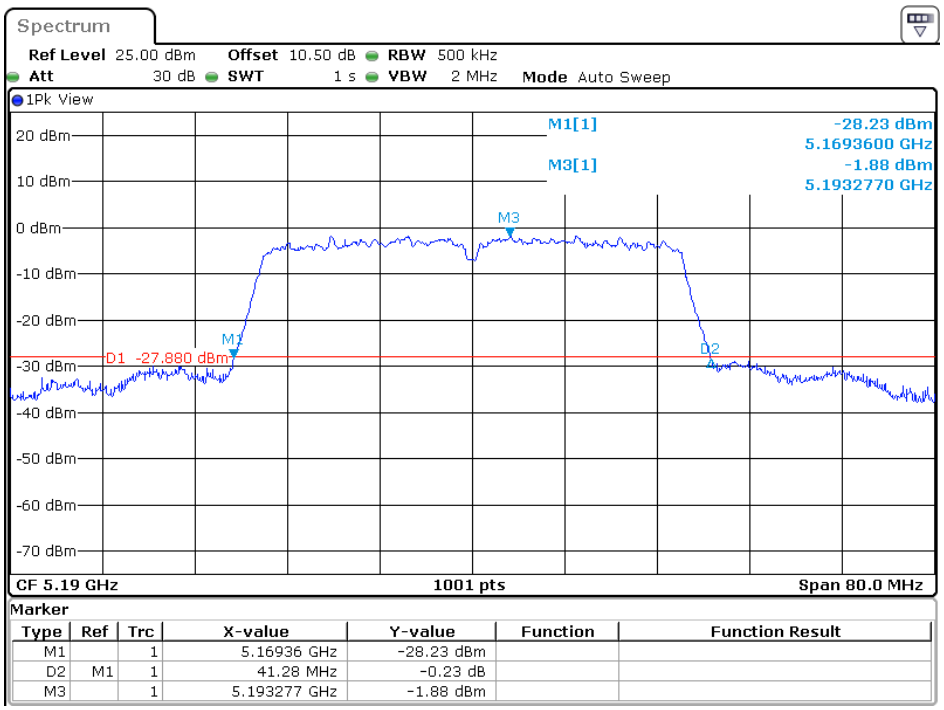


Marker

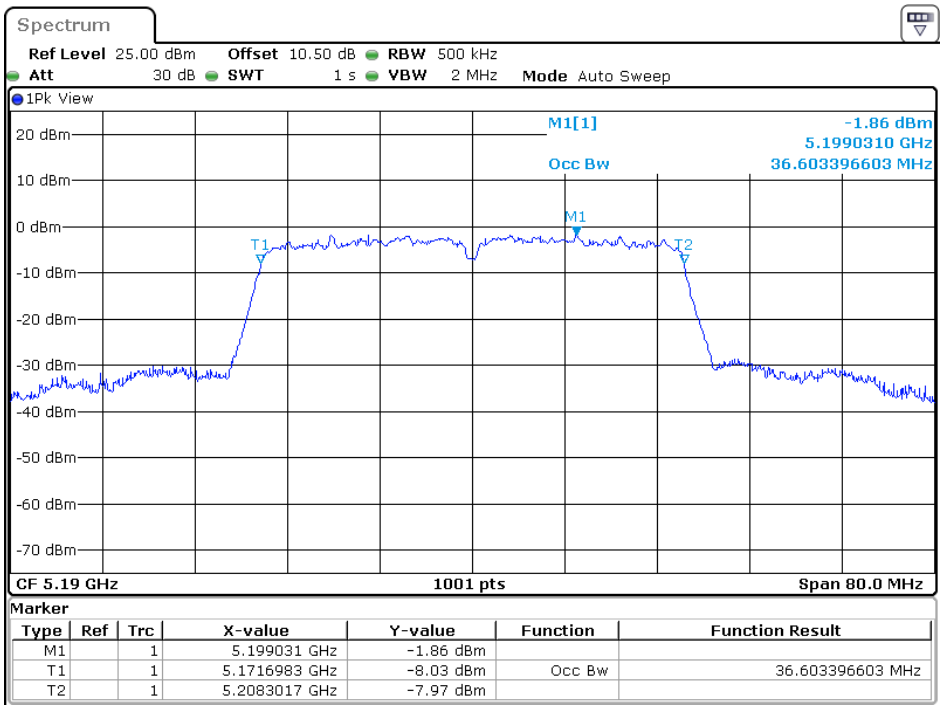
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.245355 GHz	2.17 dBm		
T1		1	5.230969 GHz	-4.81 dBm	Occ Bw	17.982017982 MHz
T2		1	5.248951 GHz	-4.92 dBm		

Date: 18.AUG.2022 20:48:28

802.11n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5190 MHz

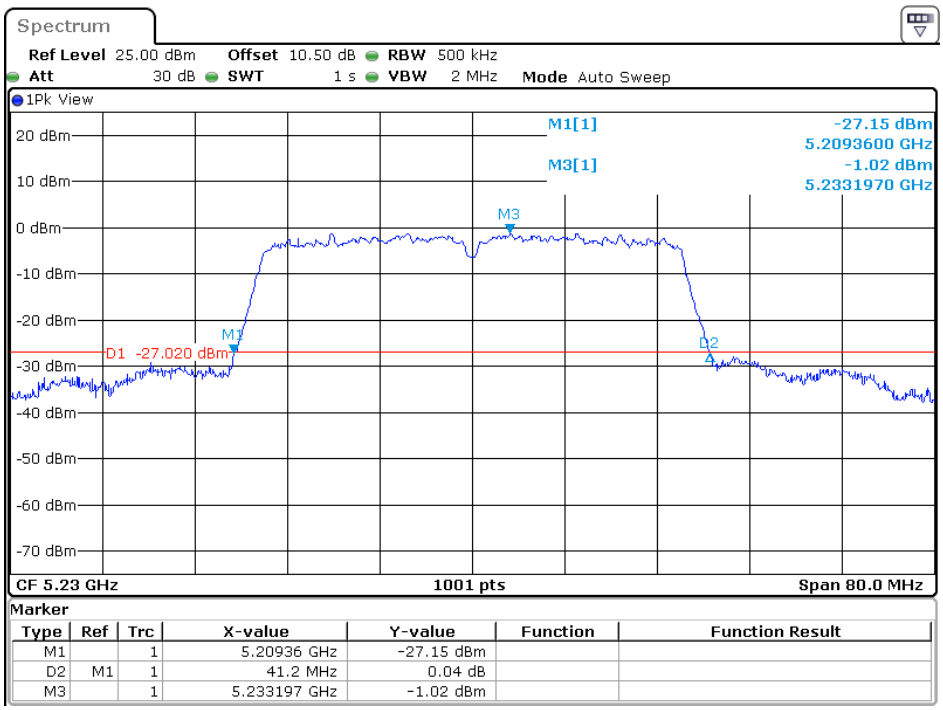


Date: 18.AUG.2022 20:52:31

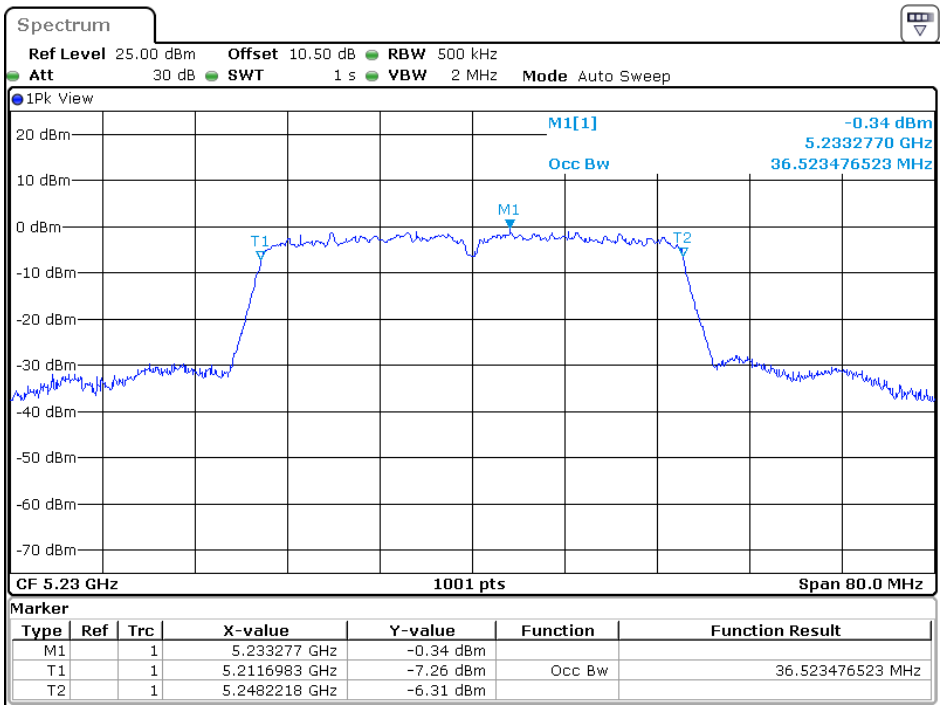


Date: 18.AUG.2022 20:52:01

802.11n40 mode, 26 dB Emissions & 99% Occupied Bandwidth, 5230 MHz



Date: 18.AUG.2022 20:55:52

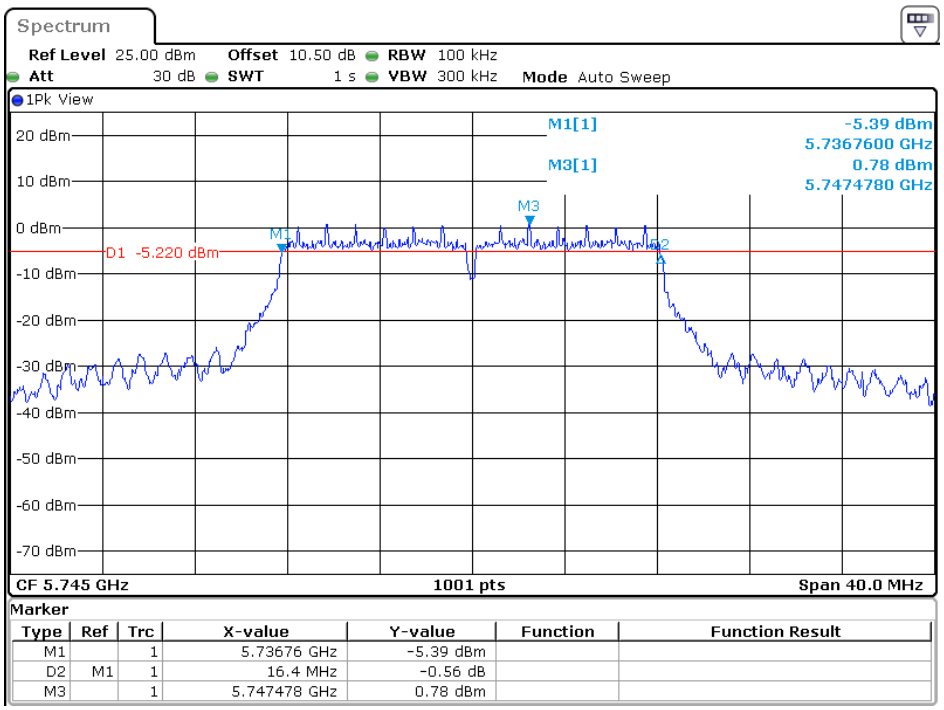


Date: 18.AUG.2022 20:55:22

5725 MHz – 5850 MHz:

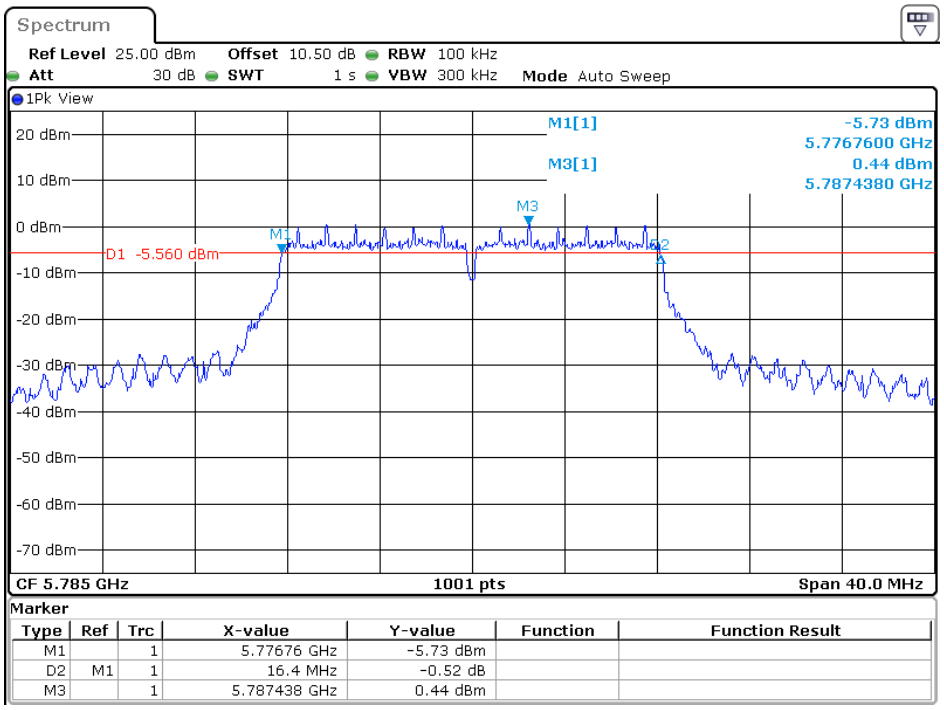
Frequency (MHz)	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	Remark
802.11a			No transmitted signal in the 99% bandwidth extends into the U-NII-2C band
5745	16.40	17.46	
5785	16.40	17.46	
5825	16.40	17.54	
802.11n20			
5745	17.68	18.18	
5785	17.68	18.14	
5825	17.68	18.22	
802.11n40			
5755	36.40	36.60	
5795	36.40	36.68	

802.11a mode, 6dB Emission Bandwidth, 5745 MHz



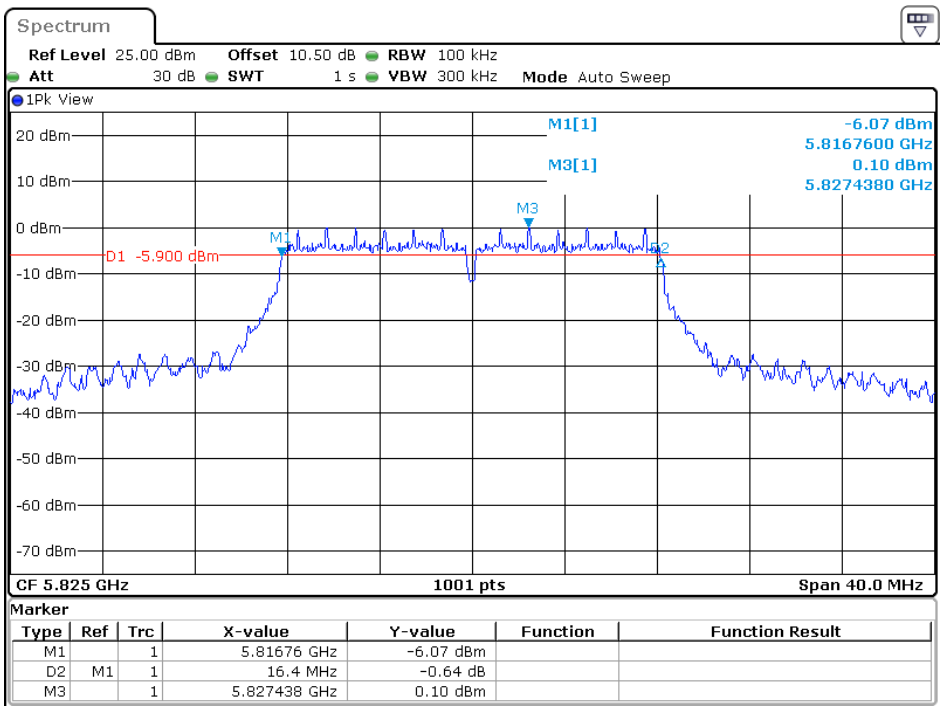
Date: 18.AUG.2022 21:00:13

802.11a mode, 6dB Emission Bandwidth, 5785 MHz



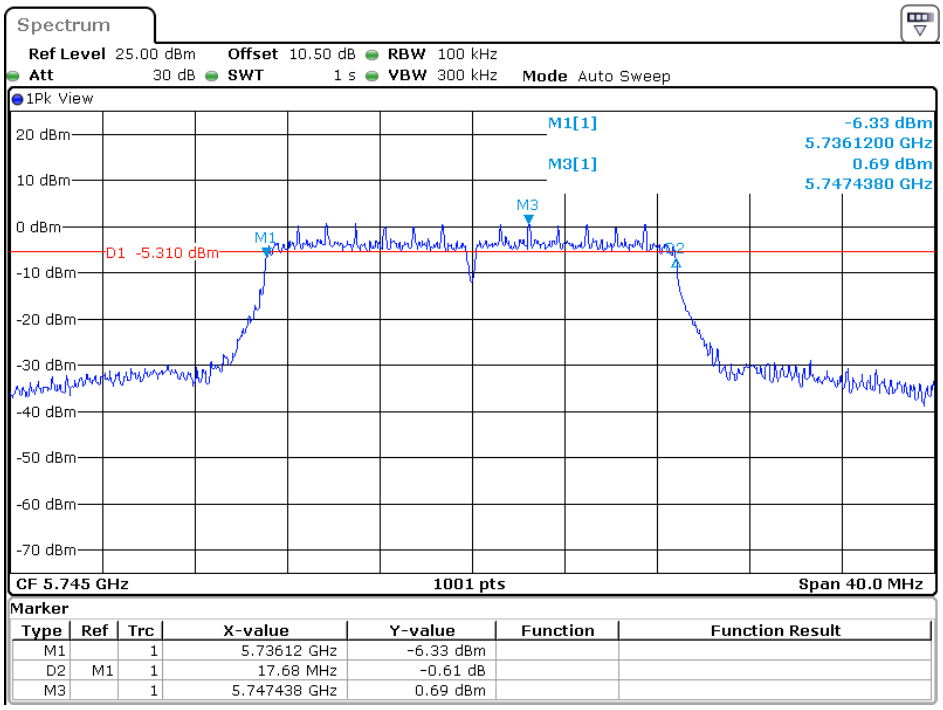
Date: 18.AUG.2022 21:02:59

802.11a mode, 6dB Emission Bandwidth, 5825 MHz



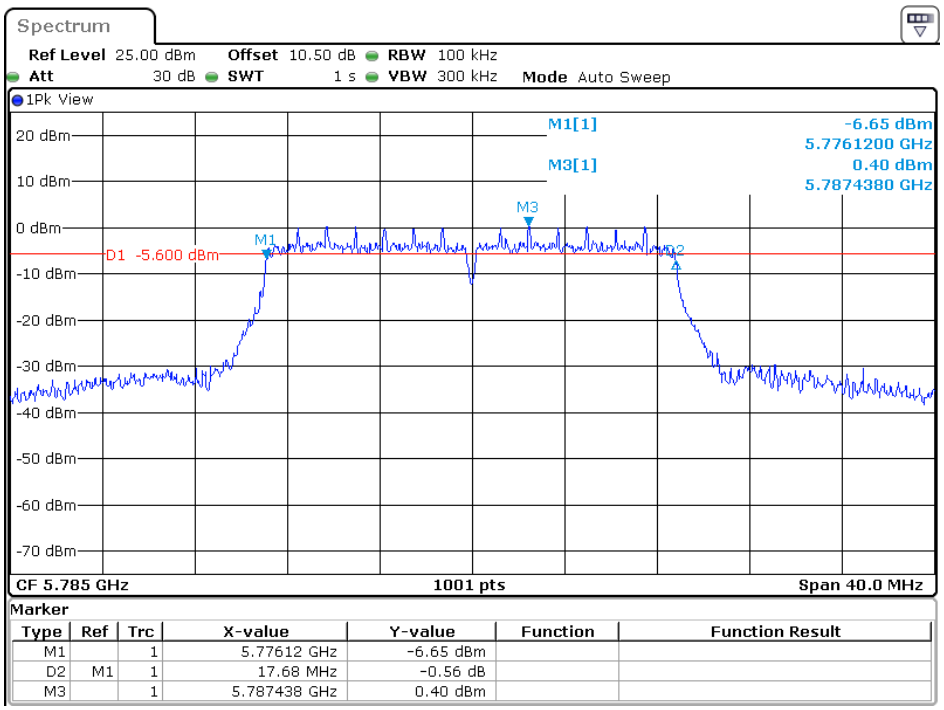
Date: 18.AUG.2022 21:05:49

802.11n20 mode, 6dB Emission Bandwidth, 5745 MHz



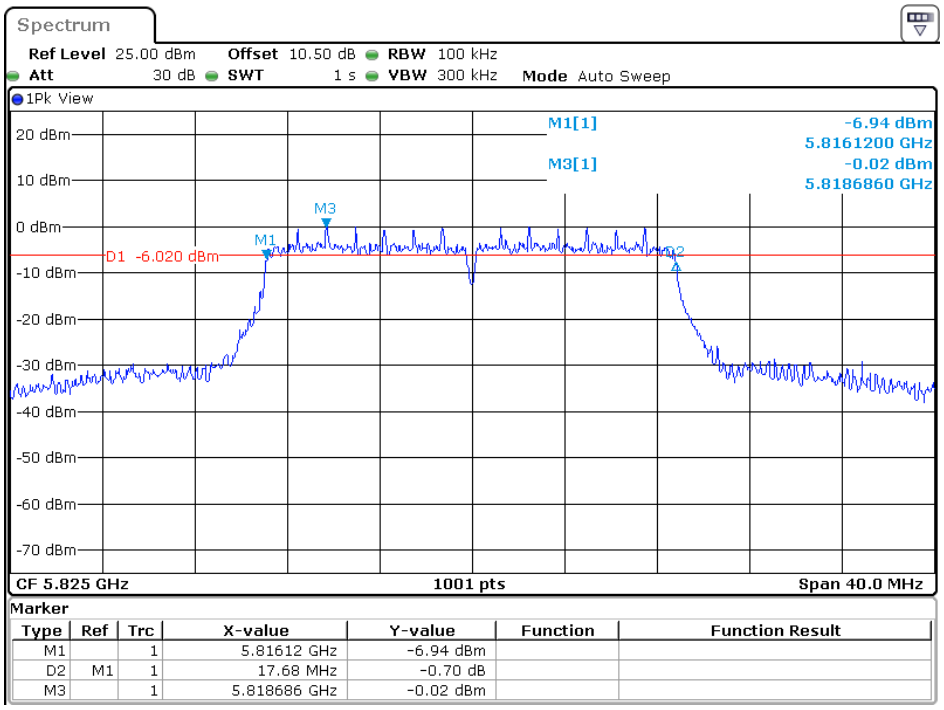
Date: 18.AUG.2022 21:09:29

802.11n20 mode, 6dB Emission Bandwidth, 5785 MHz



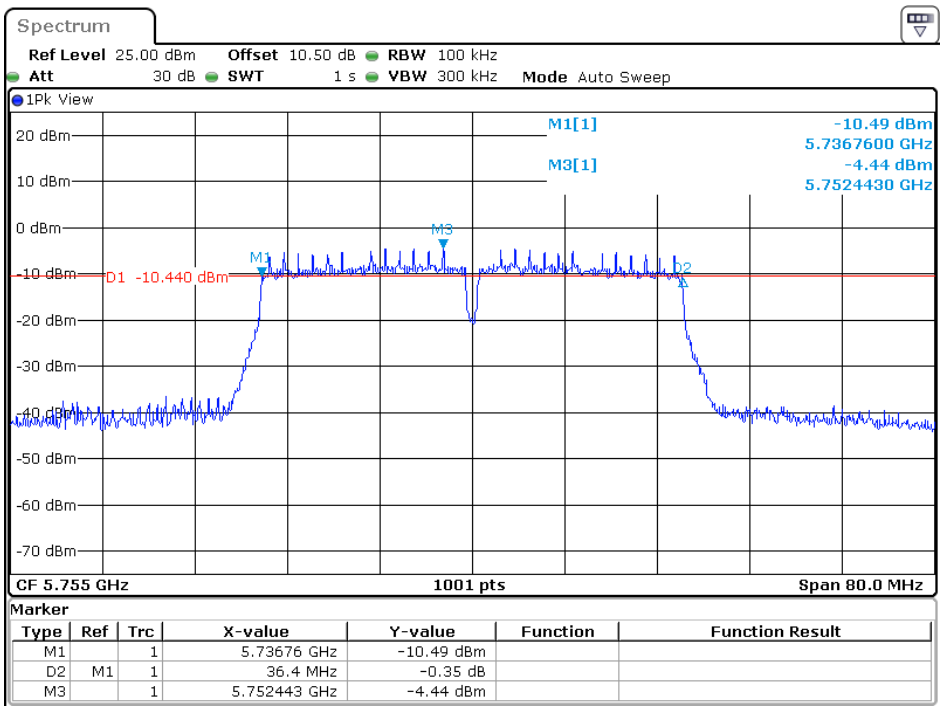
Date: 18.AUG.2022 21:14:48

802.11n20 mode, 6dB Emission Bandwidth, 5825 MHz



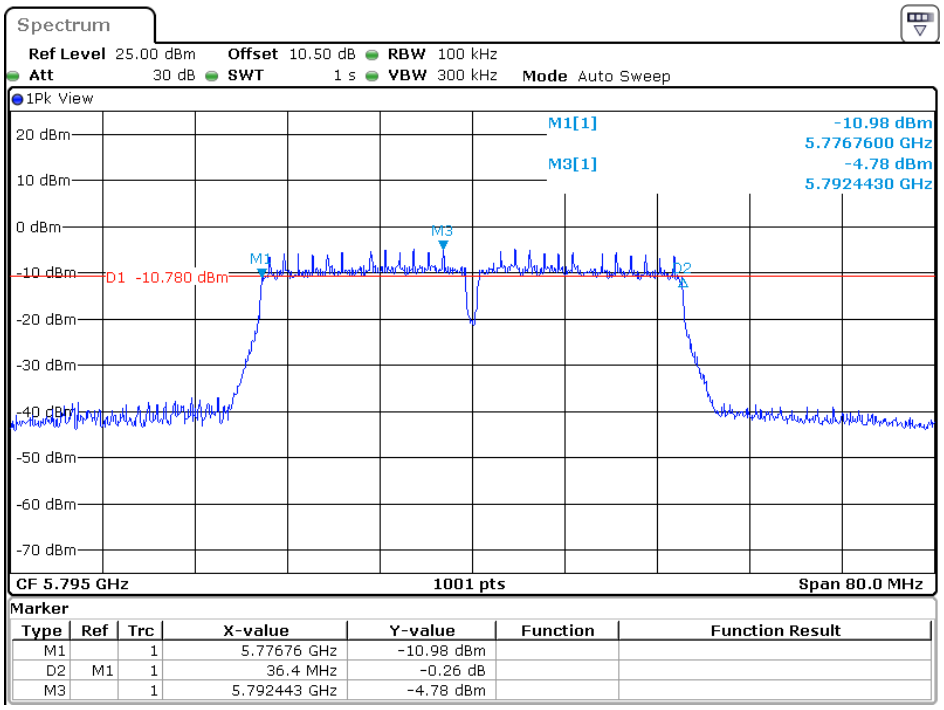
Date: 18.AUG.2022 21:18:12

802.11n40 mode, 6dB Emission Bandwidth, 5755 MHz



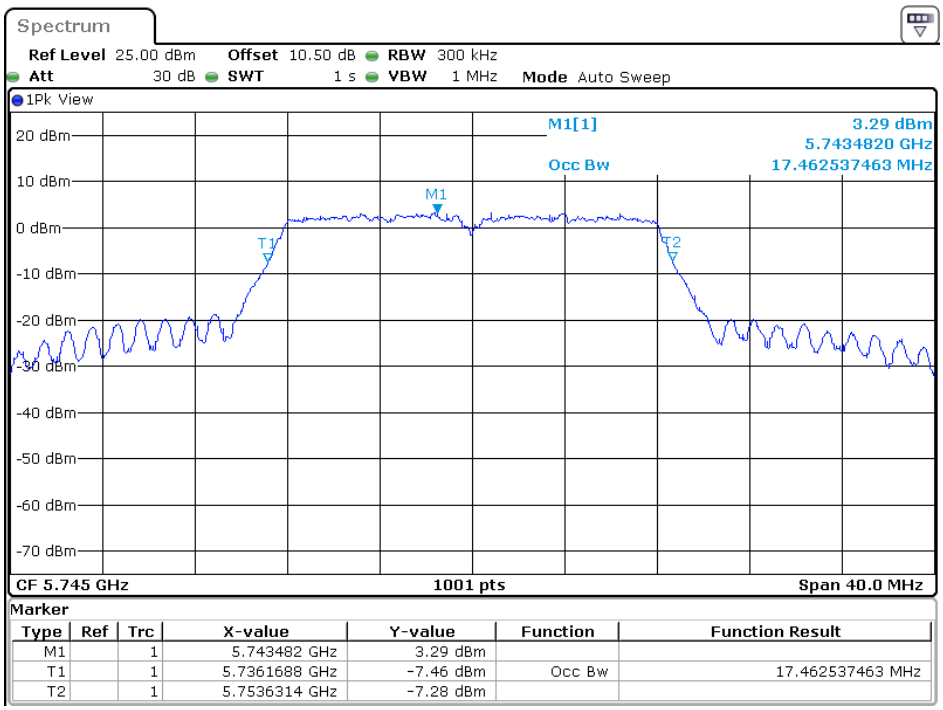
Date: 18.AUG.2022 21:21:23

802.11n40 mode, 6dB Emission Bandwidth, 5795 MHz



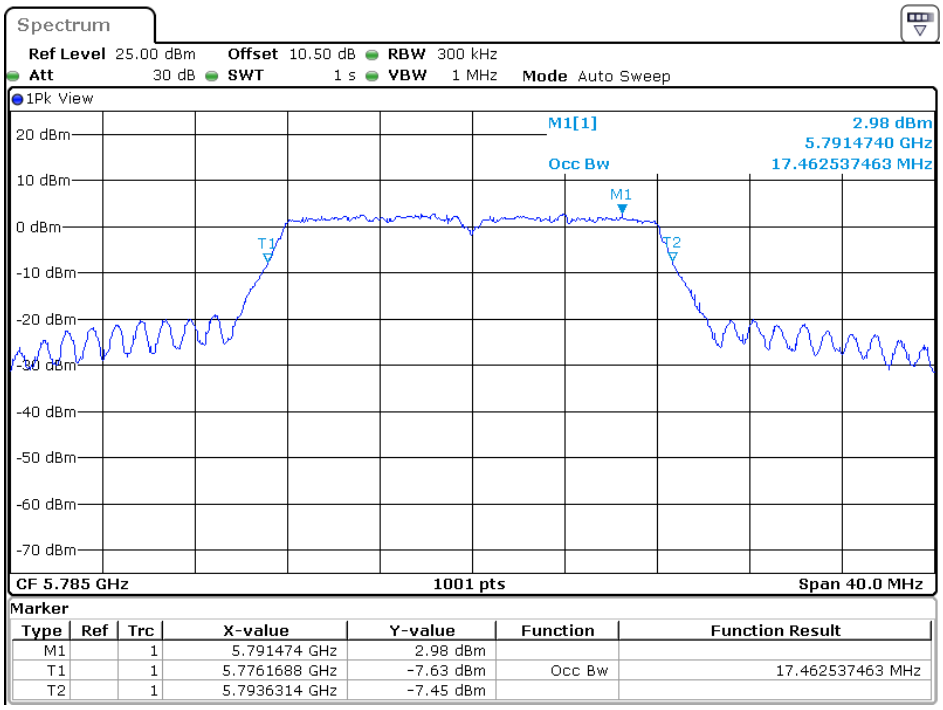
Date: 18.AUG.2022 21:24:10

802.11a mode, 99% Occupied Bandwidth, 5745 MHz



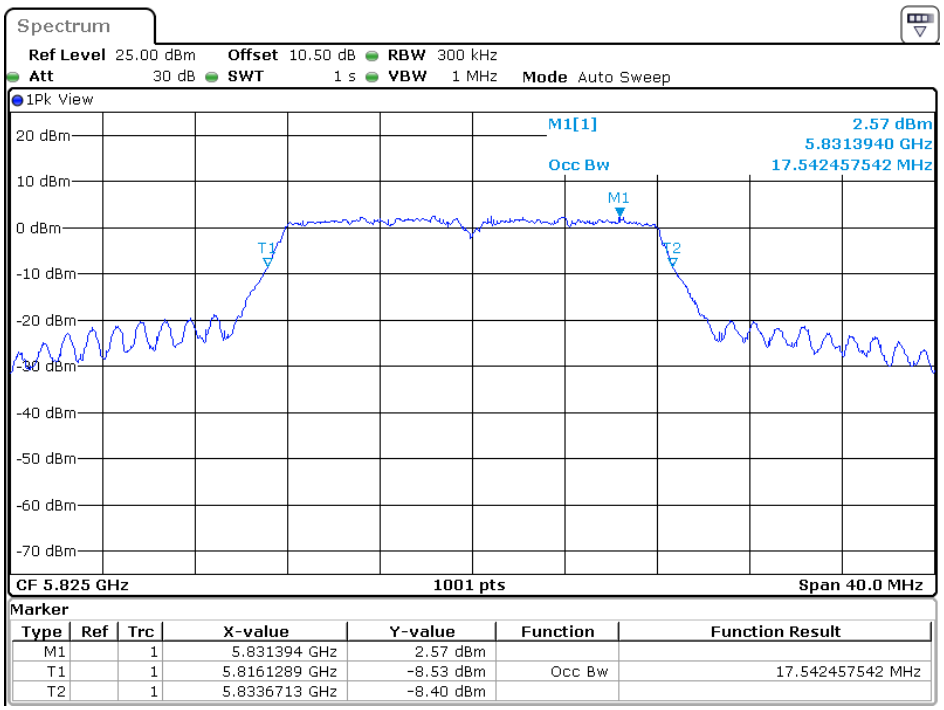
Date: 18.AUG.2022 20:59:43

802.11a mode, 99% Occupied Bandwidth, 5785 MHz



Date: 18.AUG.2022 21:02:29

802.11a mode, 99% Occupied Bandwidth, 5825 MHz

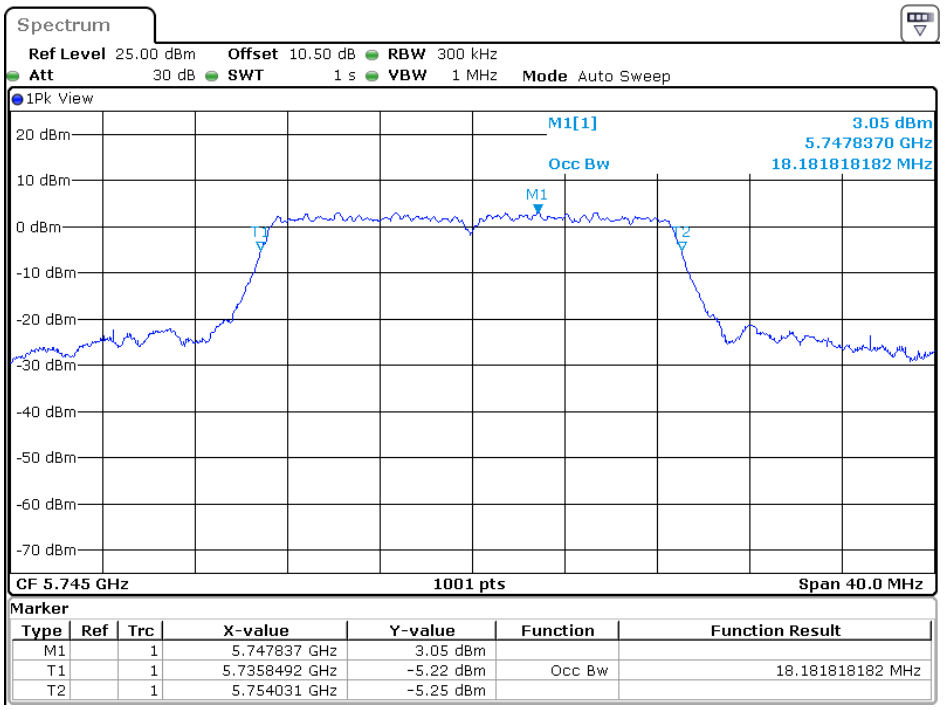


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.831394 GHz	2.57 dBm		
T1		1	5.8161289 GHz	-8.53 dBm	Occ Bw	17.542457542 MHz
T2		1	5.8336713 GHz	-8.40 dBm		

Date: 18.AUG.2022 21:05:19

802.11n20 mode, 99% Occupied Bandwidth, 5745 MHz

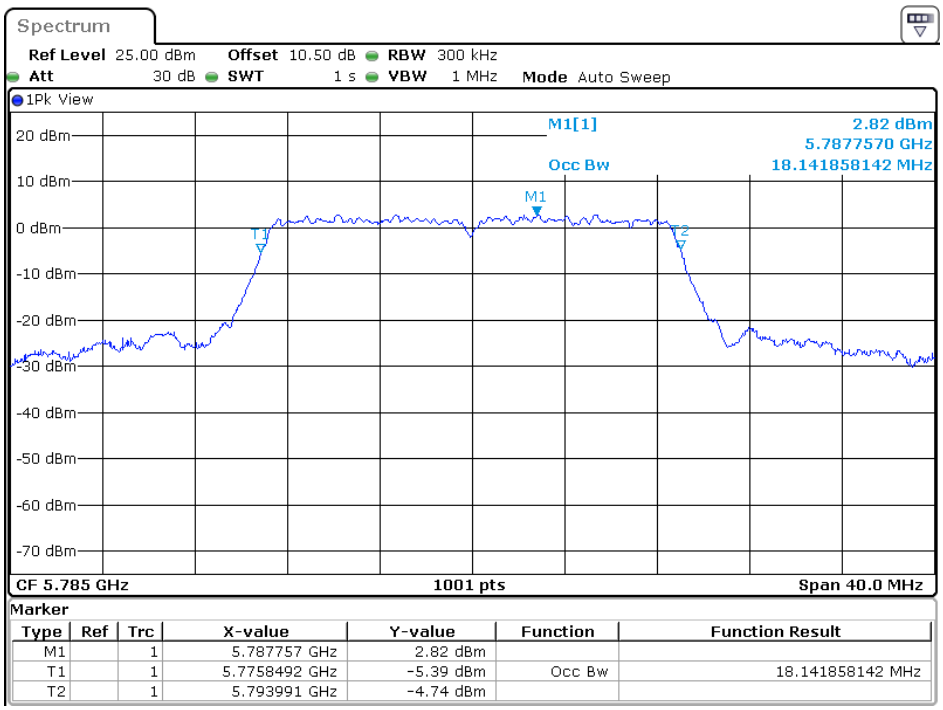


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.747837 GHz	3.05 dBm		
T1		1	5.7358492 GHz	-5.22 dBm	Occ Bw	18.181818182 MHz
T2		1	5.754031 GHz	-5.25 dBm		

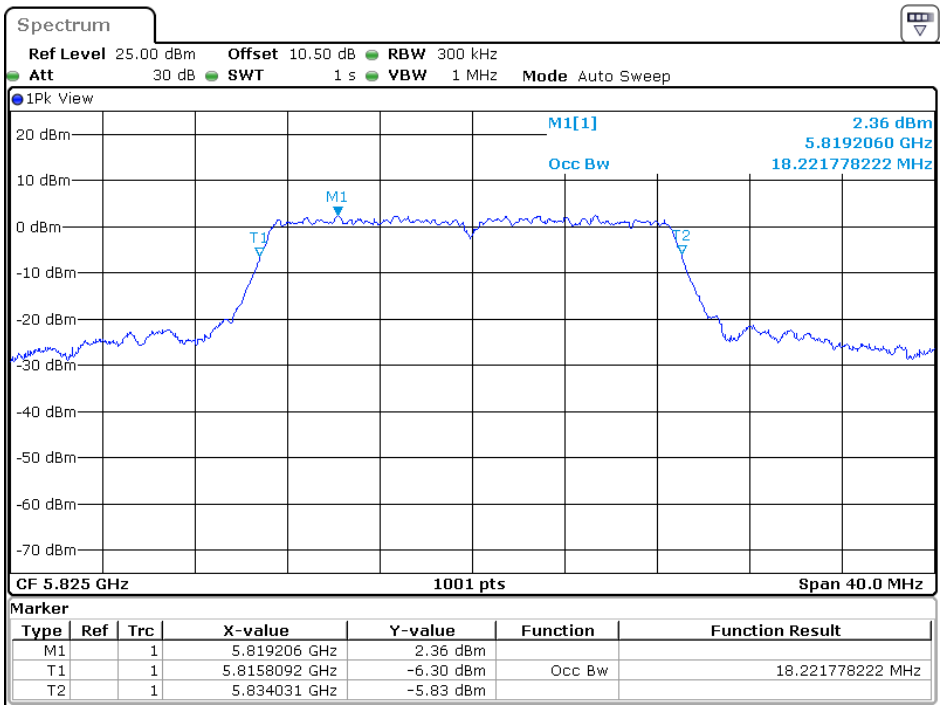
Date: 18.AUG.2022 21:08:59

802.11n20 mode, 99% Occupied Bandwidth, 5785 MHz



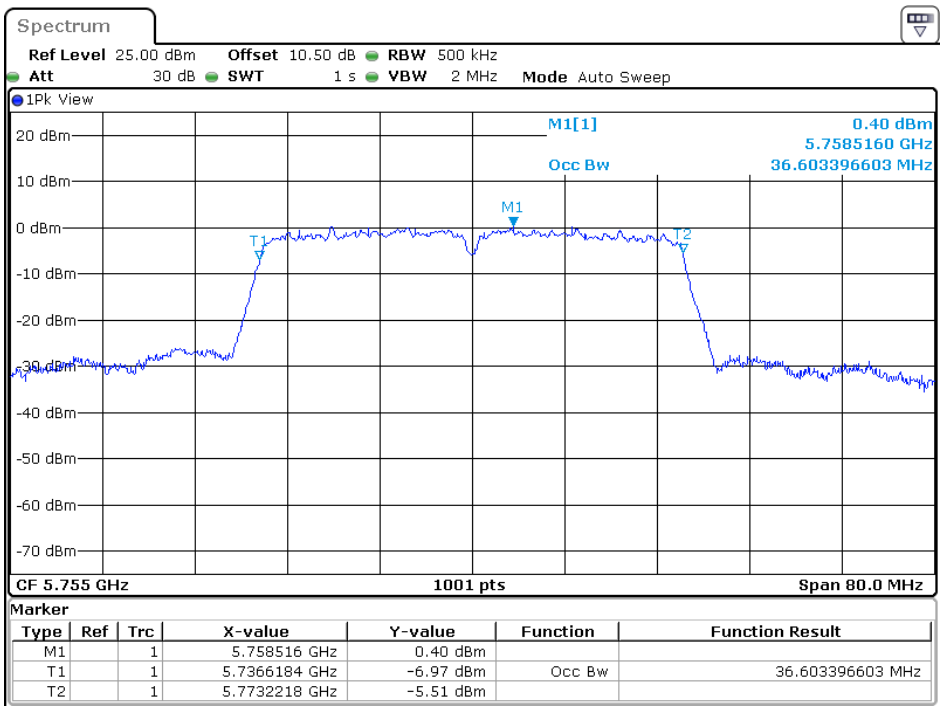
Date: 18.AUG.2022 21:14:18

802.11n20 mode, 99% Occupied Bandwidth, 5825 MHz



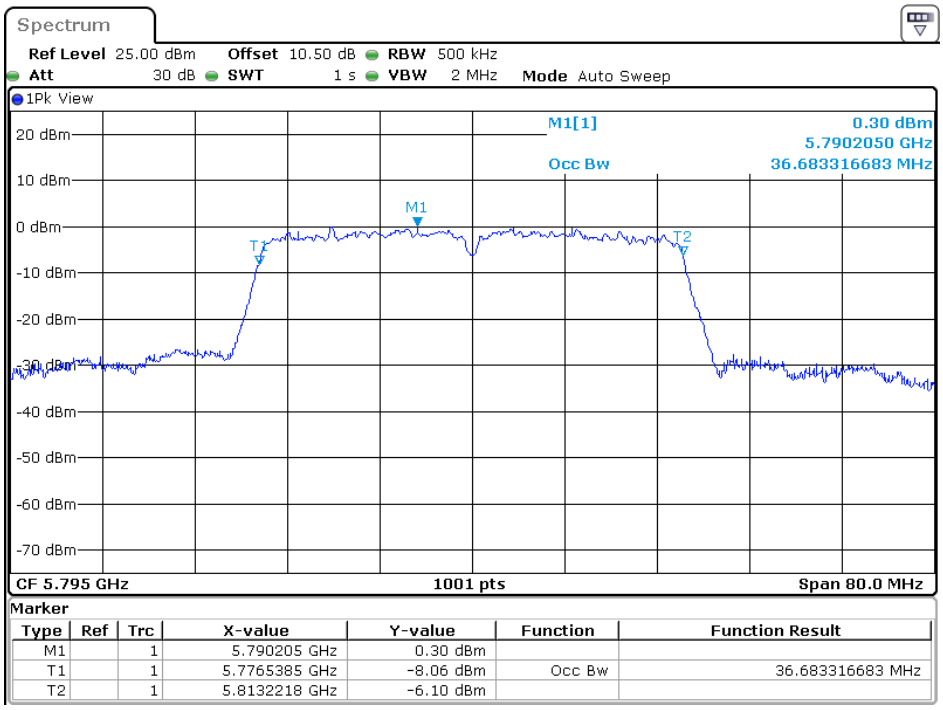
Date: 18.AUG.2022 21:17:42

802.11n40 mode, 99% Occupied Bandwidth, 5755 MHz



Date: 18.AUG.2022 21:20:53

802.11n40 mode, 99% Occupied Bandwidth, 5795 MHz



Date: 18.AUG.2022 21:23:39

FCC §15.407(a) – CONDUCTED TRANSMITTER OUTPUT POWER

Applicable Standard

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

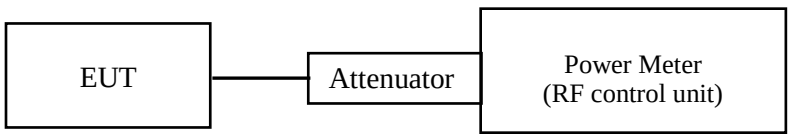
For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

c. Place the EUT on a bench and set it in transmitting mode.
d. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
e. Add a correction factor to the display.



Note: the RF control unit has a built-in power sensor.

Test Data

Environmental Conditions

Temperature:	28.4 ℃
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Andy Yu on 2022-08-18.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables.

5150 MHz – 5250 MHz:

Frequency (MHz)	Conducted Average Output Power (dBm)	Limit (dBm)
802.11a		
5180	10.11	24
5200	10.39	24
5240	10.99	24
802.11n20		
5180	10.14	24
5200	10.45	24
5240	11.08	24
802.11n40		
5190	7.73	24
5230	8.38	24

5725 MHz – 5825 MHz:

Frequency (MHz)	Conducted Average Output Power (dBm)	Limit (dBm)
802.11a		
5745	12.06	30
5785	11.74	30
5825	11.34	30
802.11n20		
5745	12.13	30
5785	11.84	30
5825	11.44	30
802.11n40		
5755	9.53	30
5795	9.19	30

Note: the duty cycle factor has added into result

FCC §15.407(a) - POWER SPECTRAL DENSITY

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

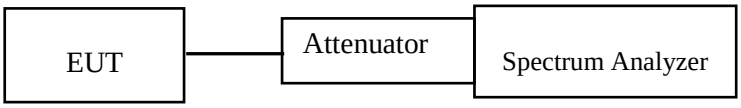
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW $\geqslant$ 1/T, where T is defined in section II.B.l.a).
b) Set VBW $\geqslant$ 3 RBW.
c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500 kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10 log (1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.



Test Data

Environmental Conditions

Temperature:	25.6 ℃
Relative Humidity:	62 %
ATM Pressure:	101.0 kPa

The testing was performed by Andy Yu on 2022-08-18.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables and plots.

5150 MHz – 5250 MHz:

Frequency (MHz)	Reading (dBm/MHz)	Duty Cycle Factor (dB)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
802.11a				
5180	-1.58	0.21	-1.37	11
5200	-1.27	0.21	-1.06	11
5240	-0.65	0.21	-0.44	11
802.11n20				
5180	-1.79	0.06	-1.73	11
5200	-1.47	0.06	-1.41	11
5240	-0.83	0.06	-0.77	11
802.11n40				
5190	-6.93	0.12	-6.81	11
5230	-6.28	0.12	-6.16	11

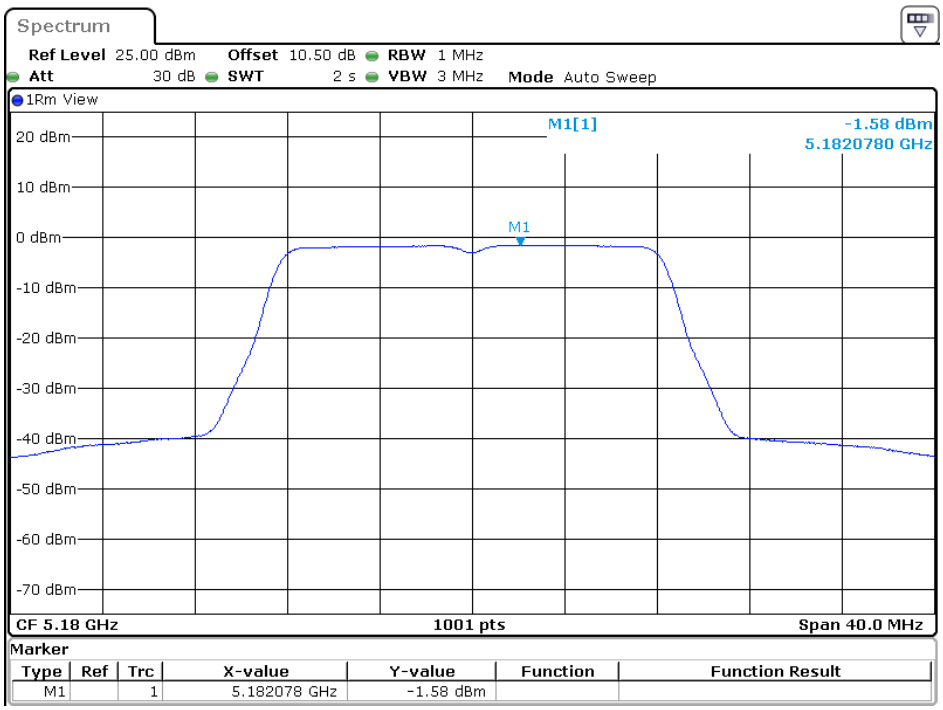
5725 MHz – 5825 MHz:

Frequency (MHz)	Reading (dBm/500kHz)	Duty Cycle Factor (dB)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)
802.11a				
5745	-2.58	0.21	-2.37	30
5785	-2.93	0.21	-2.72	30
5825	-3.33	0.21	-3.12	30
802.11n20				
5745	-2.82	0.06	-2.76	30
5785	-3.10	0.06	-3.04	30
5825	-3.51	0.06	-3.45	30
802.11n40				
5755	-8.16	0.12	-8.04	30
5795	-8.50	0.12	-8.38	30

Note:
1) Power Spectral Density = Reading + Duty Cycle Factor.
2) Duty Cycle Factor =10 log (1 / D), D=Duty Cycle
3) The EUT is a client device.

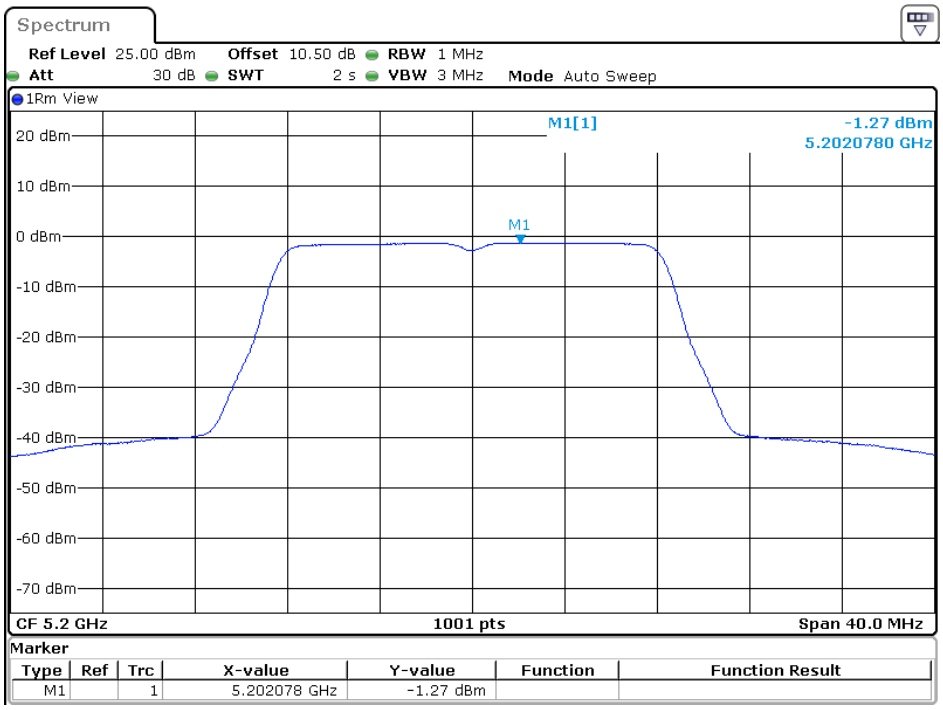
5150 MHz – 5250 MHz:

802.11a mode, Power Spectral Density, 5180 MHz



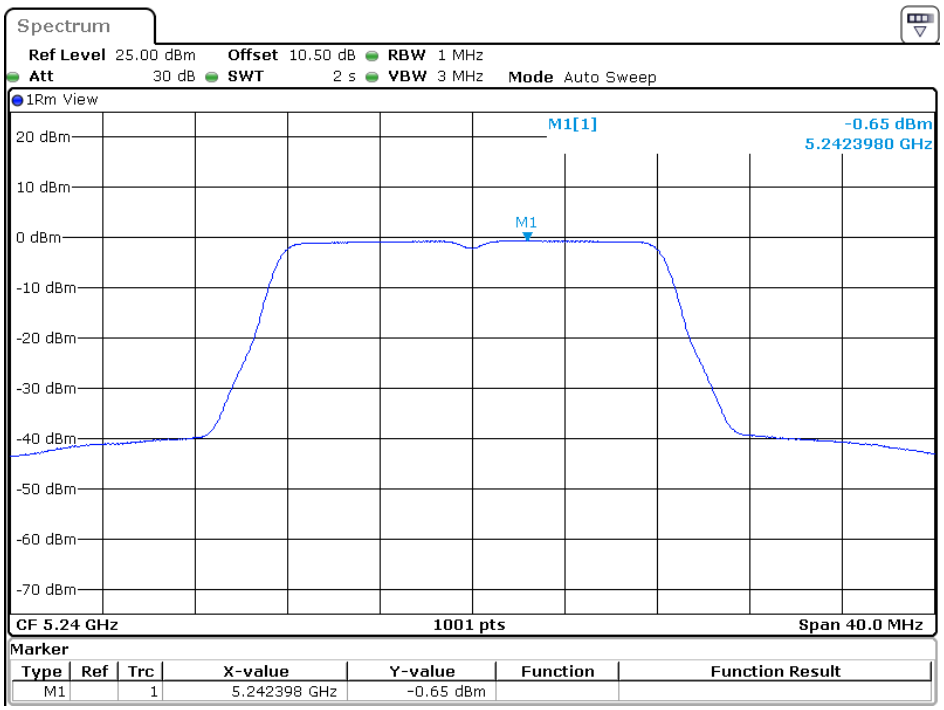
Date: 18.AUG.2022 20:34:28

802.11a mode, Power Spectral Density, 5200 MHz



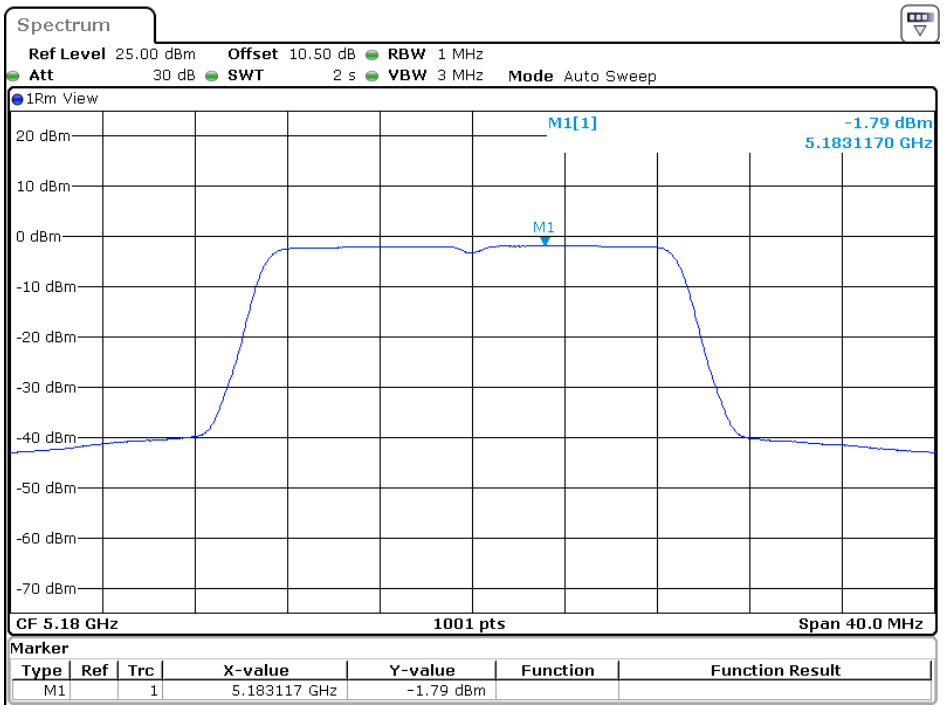
Date: 18.AUG.2022 20:37:42

802.11a mode, Power Spectral Density, 5240 MHz



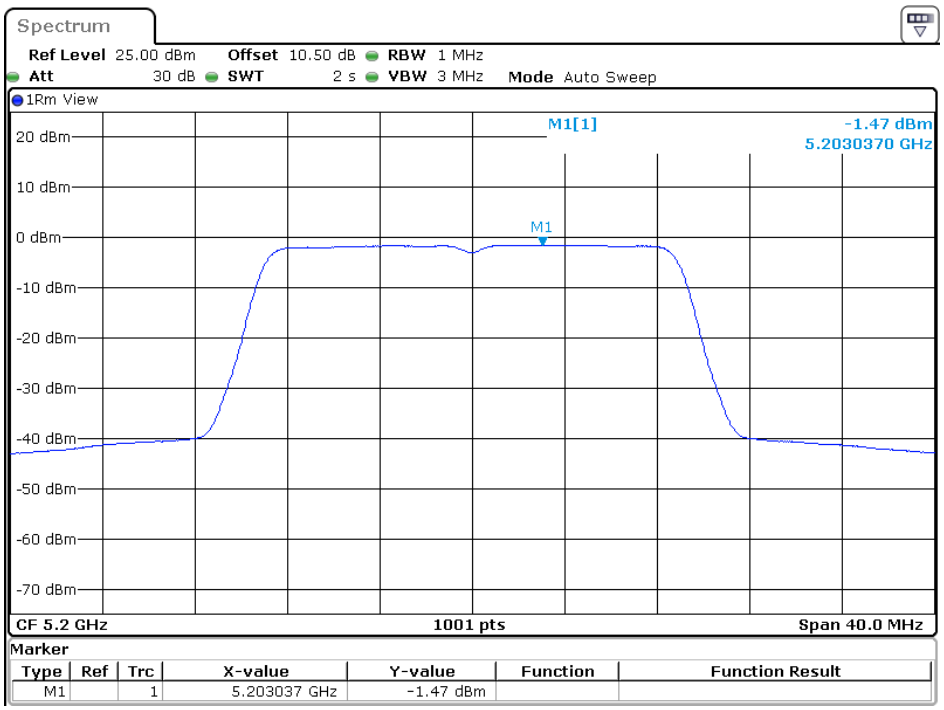
Date: 18.AUG.2022 20:40:41

802.11n20 mode, Power Spectral Density, 5180 MHz



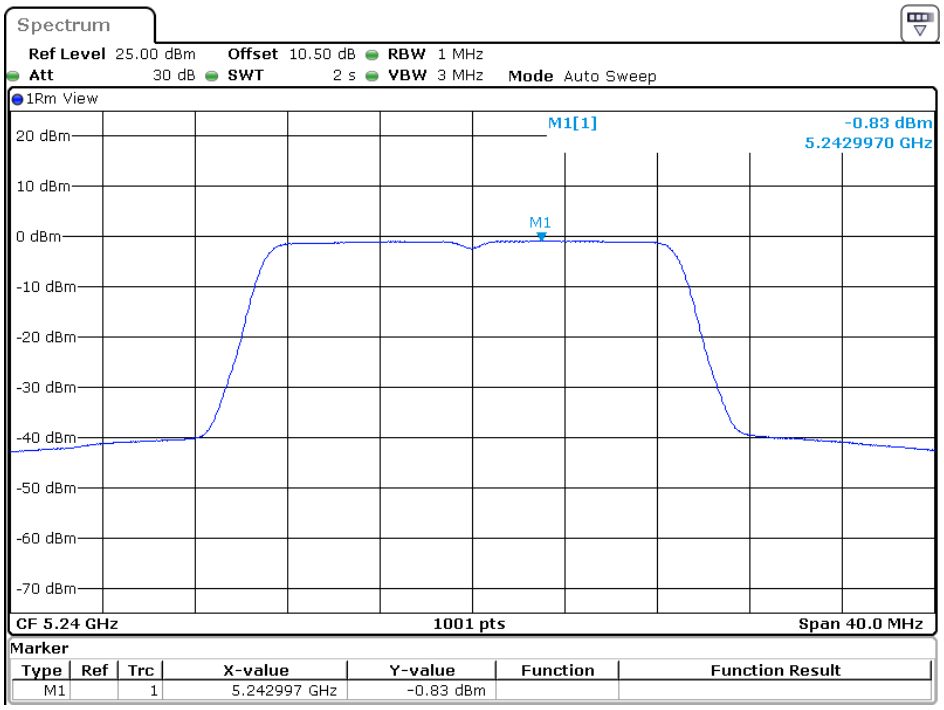
Date: 18.AUG.2022 20:44:00

802.11n20 mode, Power Spectral Density, 5200 MHz



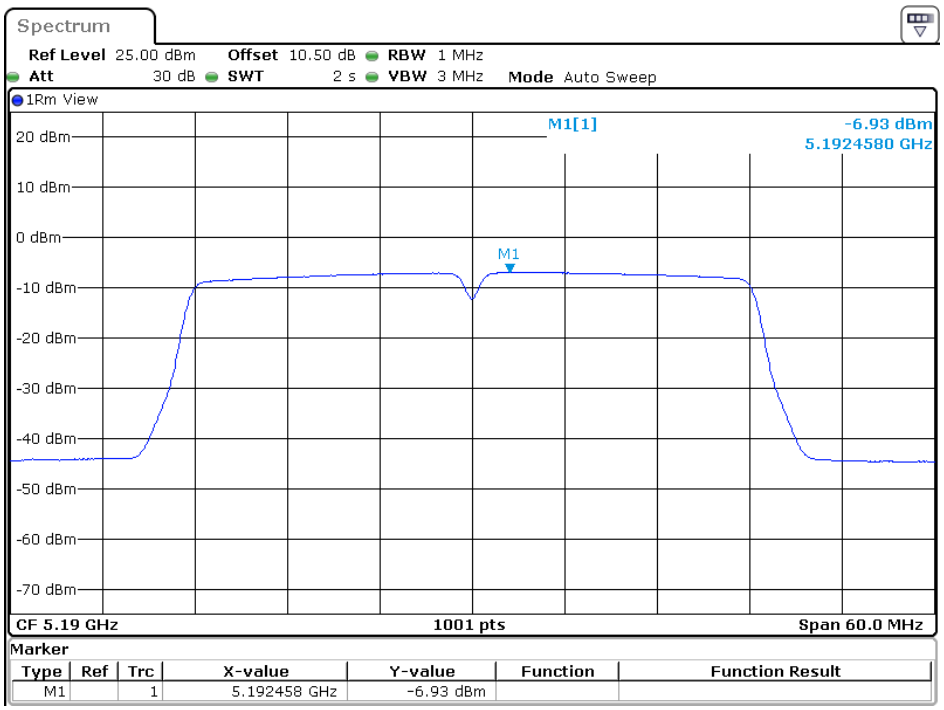
Date: 18.AUG.2022 20:46:58

802.11n20 mode, Power Spectral Density, 5240 MHz



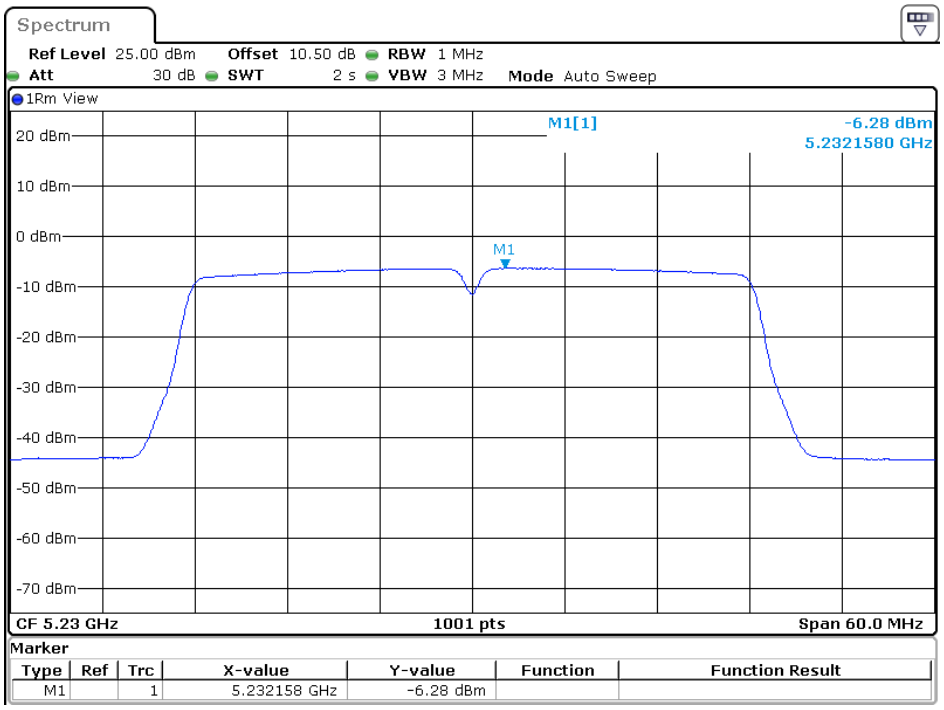
Date: 18.AUG.2022 20:49:38

802.11n40 mode, Power Spectral Density, 5190 MHz



Date: 18.AUG.2022 20:53:11

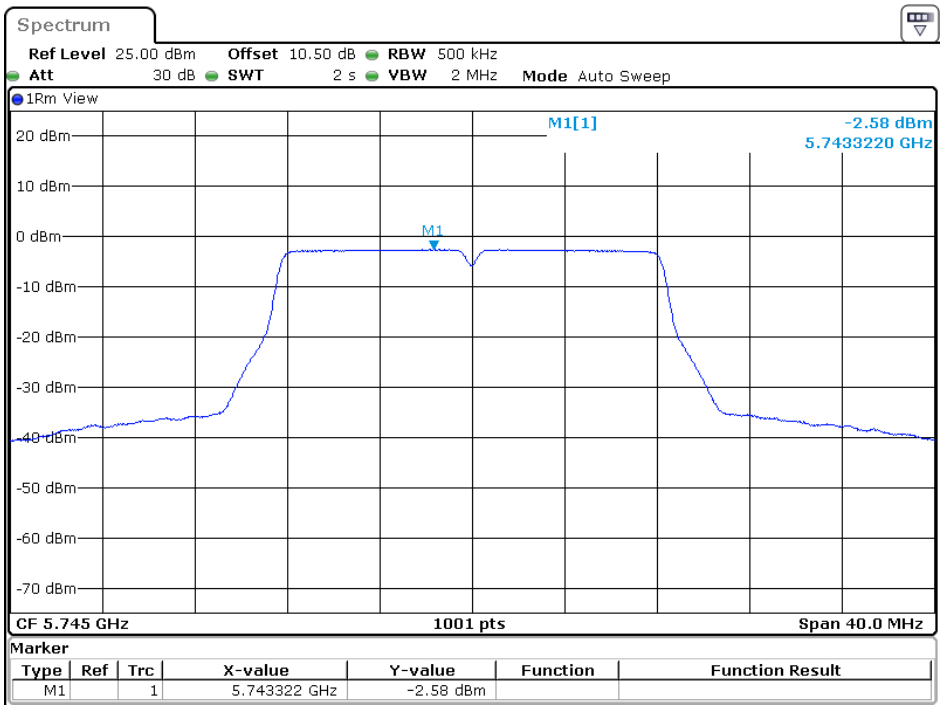
802.11n40 mode, Power Spectral Density, 5230 MHz



Date: 18.AUG.2022 20:56:33

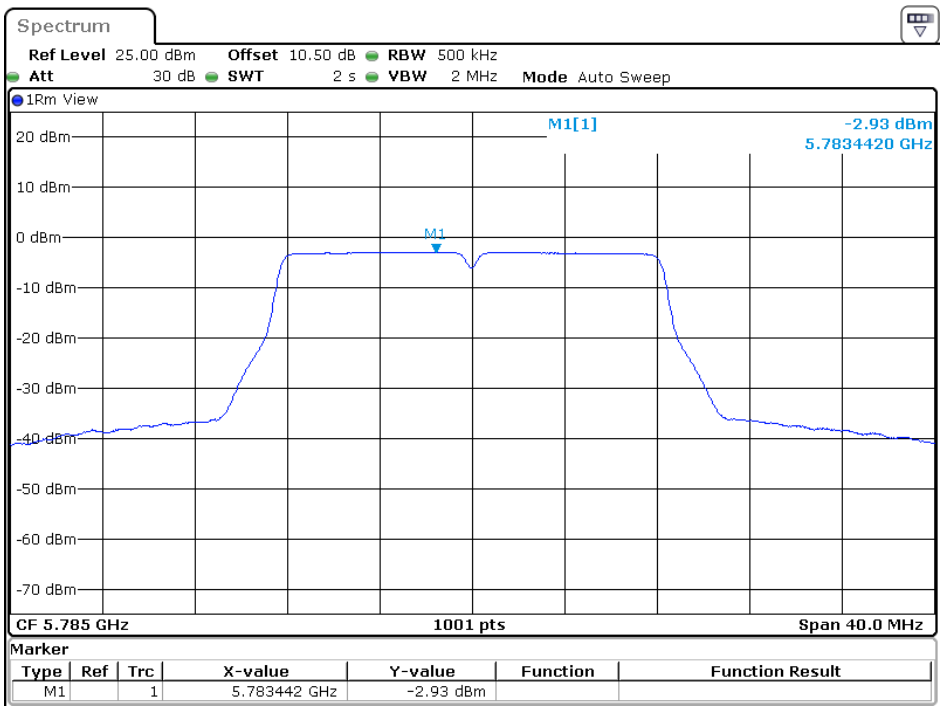
5725 MHz – 5825 MHz:

802.11a mode, Power Spectral Density, 5745 MHz



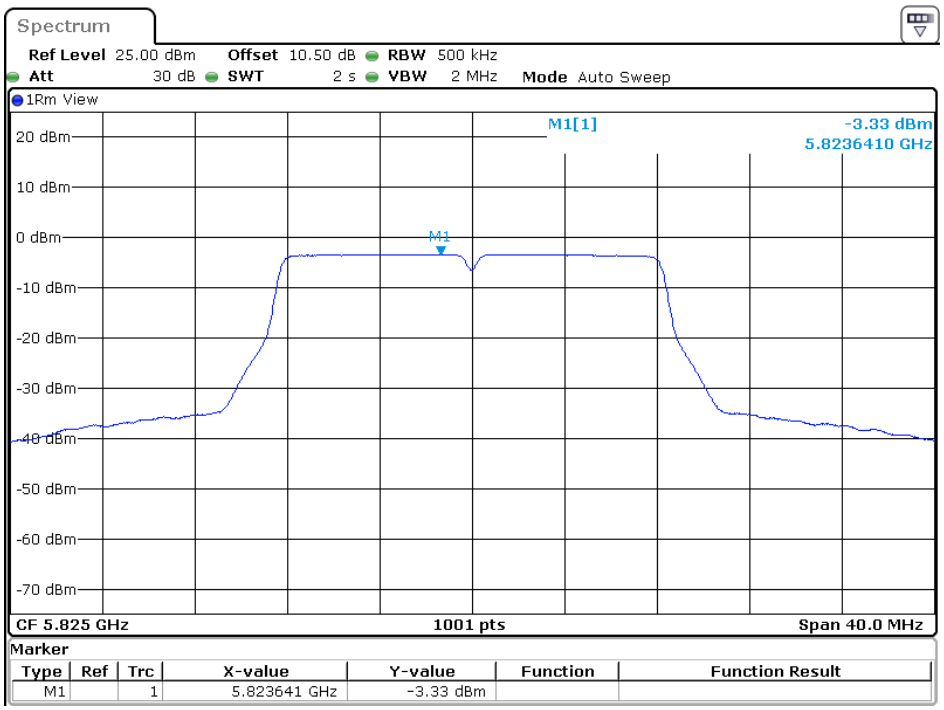
Date: 18.AUG.2022 21:00:53

802.11a mode, Power Spectral Density, 5785 MHz



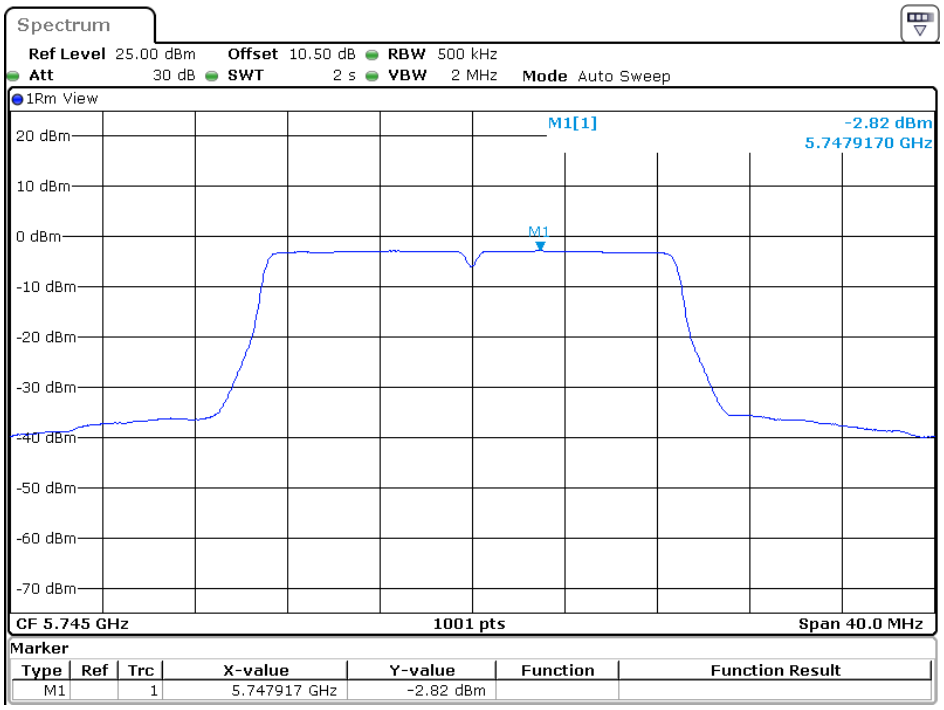
Date: 18.AUG.2022 21:03:40

802.11a mode, Power Spectral Density, 5825 MHz



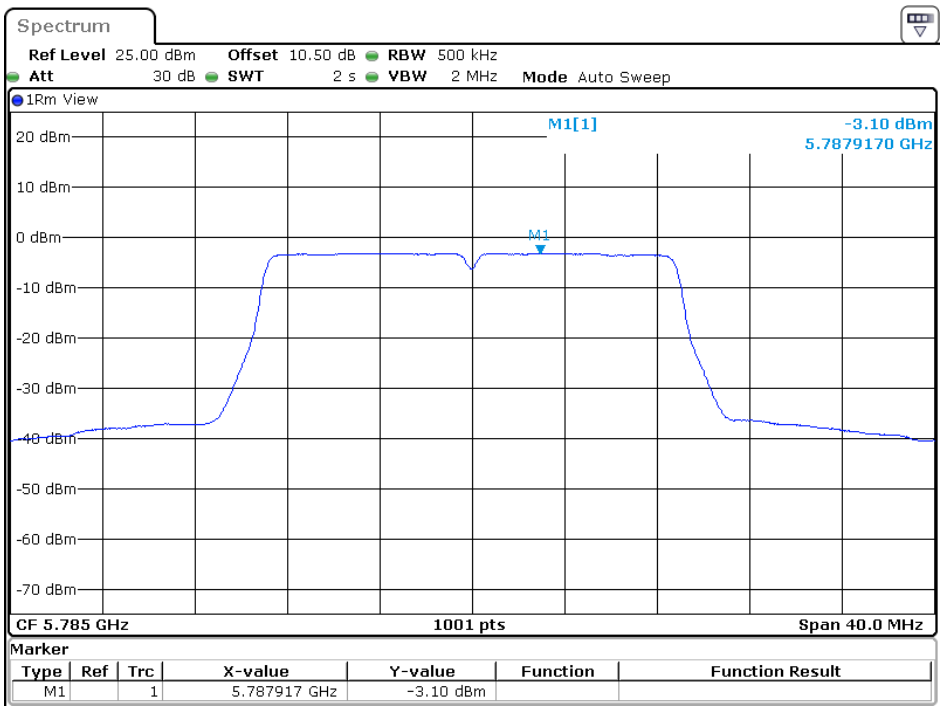
Date: 18.AUG.2022 21:06:30

802.11n20 mode, Power Spectral Density, 5745 MHz



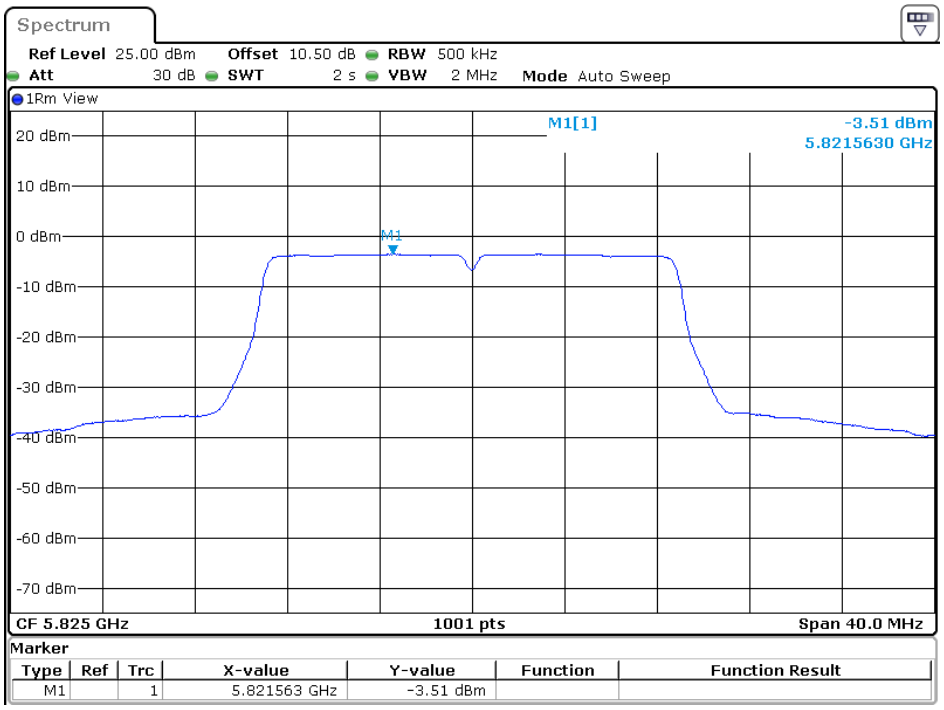
Date: 18.AUG.2022 21:10:09

802.11n20 mode, Power Spectral Density, 5785 MHz



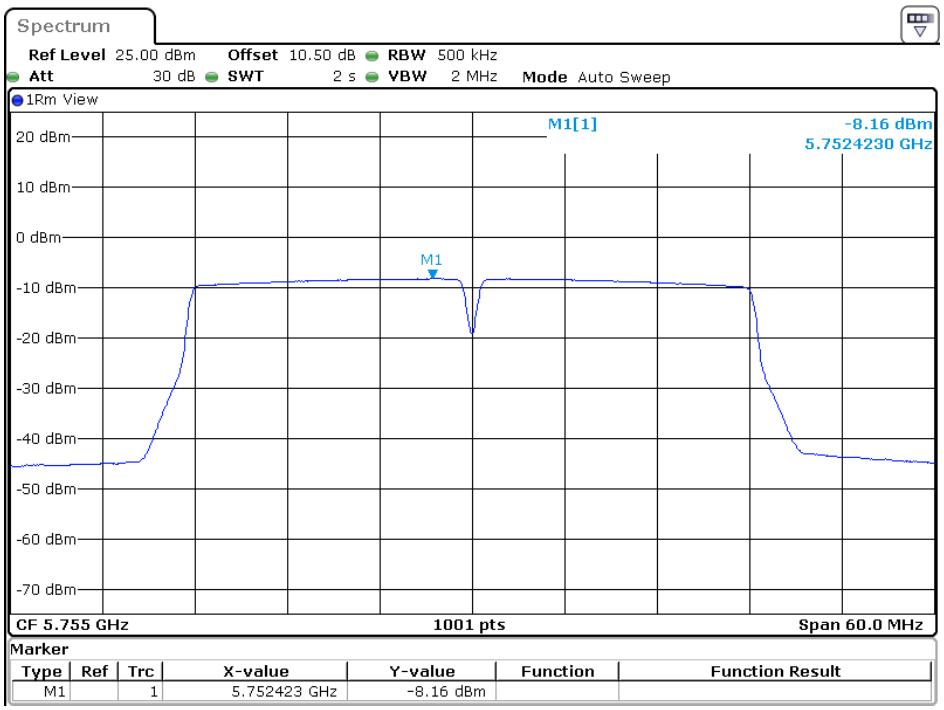
Date: 18.AUG.2022 21:15:29

802.11n20 mode, Power Spectral Density, 5825 MHz



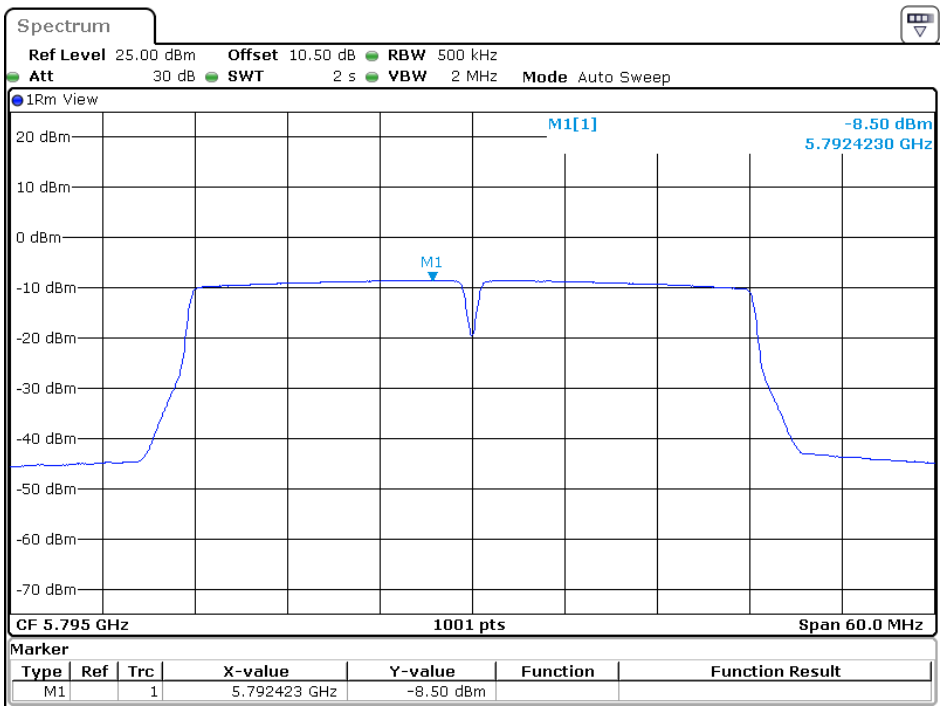
Date: 18.AUG.2022 21:18:52

802.11n40 mode, Power Spectral Density, 5755 MHz



Date: 18.AUG.2022 21:22:04

802.11n40 mode, Power Spectral Density, 5795 MHz



Date: 18.AUG.2022 21:24:50

******* END OF REPORT *******